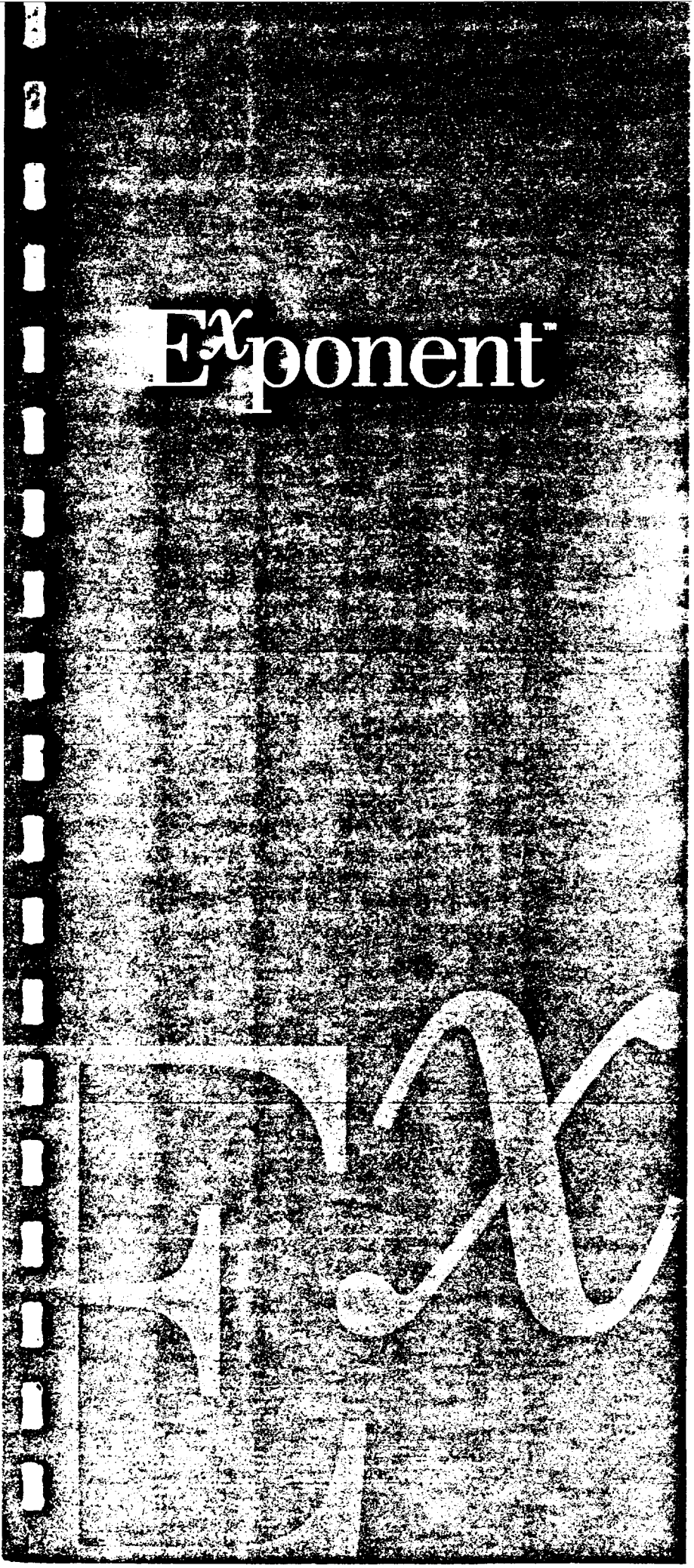

Draft

Operable Unit 1 Human Health Risk Assessment: Ventron/Velsicol Site, Wood-Ridge/Carlstadt, New Jersey

Prepared for

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Rosemont, Illinois

Morton International, Inc.
Chicago, Illinois

Exponent

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Acronyms and Abbreviations

BERA	baseline ecological risk assessment
bgs	below ground surface
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CoPC	chemical of potential concern
CSF	carcinogenic slope factor
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
HHRA	human health risk assessment
HMDC	Hackensack Meadowlands Development Commission
IRIS	Integrated Risk Information System
NCP	National Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
OU1	Operable Unit 1
OU2	Operable Unit 2
PAH	polycyclic aromatic hydrocarbon
POTW	publicly owned treatment works
RAGS	Risk Assessment Guidance for Superfund
RBC	risk-based concentration
Resolution	Resolution of the Berry's Creek/Wood-Ridge Site Action Committee
RfD	reference dose
RfDd	dermal reference dose
RI	remedial investigation
RI/FS	remedial investigation and feasibility study
RME	reasonable maximum exposure
Stipulation	Stipulation and Supplementary Order Approving Cooperative Agreement for Remedial Investigation and Feasibility Study and Amending Procedural Order Involving Remedy
the site	Ventron/Velsicol site
UCL	upper confidence limit
Velsicol	Velsicol Chemical Corporation

Executive Summary

On behalf of Morton International and Velsicol Chemical Corporation (Velsicol), Exponent has prepared a draft human health risk assessment (HHRA) for Operable Unit 1 (OU1) of the Ventron/Velsicol site located in Wood-Ridge and Carlstadt, New Jersey. The remedial investigation report (RI) and the ecological assessment (ERA) were submitted under separate cover. The risk assessments are part of the remedial investigation and feasibility study (RI/FS) required by the "Resolution of the Berry's Creek/Wood-Ridge Site Action Committee" (Resolution) with the New Jersey Department of Environmental Protection (NJDEP), executed on August 15, 1996. The Resolution is an amendment to the October 26, 1984, "Stipulation and Supplementary Order Approving Cooperative Agreement for Remedial Investigation and Feasibility Study and Amending Procedural Order Involving Remedy" (Stipulation). The Stipulation covers the approximately 38-acre Ventron/Velsicol site and the areas of Berry's Creek potentially affected by industrial activity at the site, while the Resolution provides for implementation of a separate RI/FS for the Ventron/Velsicol site. The Ventron/Velsicol site is designated as a National Priorities List (NPL) site, identified by U.S. Environmental Protection Agency (EPA) number NJD980529879 and bearing CERCLIS ID number 02C7. This risk assessment evaluates the 26-acre portion of the site designated as OU1. OU1 consists of developed and undeveloped areas, associated groundwater, the onsite basin, and the West Ditch.

Contaminants of Potential Concern

The HHRA used a conservative screening process to select contaminants of potential concern (CoPCs) to ensure that any chemicals that could be of concern are fully evaluated. All available chemical concentration data were reviewed for soil, groundwater, air, and sediments and water in OU1. Site concentration data were compared with conservative risk-based concentrations derived by EPA Region IX. A total of 41 CoPCs (or groups of CoPCs) were identified for further analysis in the HHRA, including one or more CoPCs identified in each medium evaluated. Mercury was identified as a CoPC in all site media.

Exposure Assessment

The OU1 site under consideration includes a developed area, which is currently under commercial use, and an undeveloped area. Wood-Ridge has zoned the site area as "light industrial park" (Kolicko 1997, pers. comm.), and thus, future residential use is considered unlikely. Given the site characteristics, current use, and zoning regarding future use, the most likely potential human receptors include onsite workers and trespassers who might visit the site. Onsite workers are likely to be the receptor population with the highest exposure potential. The HHRA quantitatively evaluated site media for the following hypothetical exposure pathways:

- **Surface soils in developed area:** Incidental ingestion and dermal contact with CoPCs by long-term workers and construction workers. Because the developed area of the site is currently predominantly paved, a current scenario evaluated the few unpaved areas, whereas the paved and unpaved areas together are considered in a future scenario.
- **Surface soils in undeveloped area:** Incidental ingestion, dermal contact, and inhalation of CoPCs by long-term workers, construction workers, and trespassers who might visit the site.
- **Subsurface soils in developed and undeveloped areas:** Ingestion and dermal contact with CoPCs in subsurface soils by a construction workers.
- **Groundwater:** Ingestion of and dermal contact with CoPCs in groundwater are evaluated in a hypothetical site-wide future long-term worker scenario.
- **Surface water and sediments in OU1:** Incidental ingestion and dermal contact with surface water by a trespasser who might contact CoPCs in the onsite basin or West Ditch.
- **Outdoor air:** Inhalation of outdoor air by long-term workers in the developed or undeveloped area.

Conservative methods identified by EPA in risk assessment guidance documents were used to evaluate potential exposures. Some of the assumptions used in the risk assessment may have overestimated likely risks. In particular, the assumption that site groundwater could be used as drinking water is likely to be an overestimate of risk, given the availability of an alternative drinking water source. Similarly, although the risk assessment assumed commercial use of the undeveloped area, such use is not likely without filling this area and thus mitigating exposure to chemicals in surface soil.

Toxicity Assessment

EPA toxicity values (i.e., cancer slope factors [CSFs] or reference doses [RfDs]) were identified for all CoPCs. Risk calculations were based on the current EPA toxicity values for all CoPCs. EPA extensively reviews and verifies RfDs and CSFs derived for risk assessment and, once verified and posted in the Integrated Risk Information System (IRIS) (U.S. EPA 2001a), they represent Agency consensus. Mercury and arsenic were responsible for the majority of site risks. Arsenic risk, however, is likely to be at least partly related to naturally occurring arsenic in soils. The EPA reference dose for mercury was used as a basis for the risk assessment. However, the potential for application of this RfD to result in an overestimate of site risk is considered in the uncertainty assessment.

Risk Characterization and Conclusions

EPA toxicity values (i.e., CSFs or RfDs) were combined with exposure estimates to derive estimates of potential health risks related to exposure to CoPCs in media of OU1. Cancer risk estimates were compared to EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4} established in the National Contingency Plan for Superfund sites (U.S. EPA 1990b). The lifetime risk of developing cancer in the U.S. population is approximately one in two (i.e., 5×10^{-1}) for men and approximately one in three (i.e., 3×10^{-1}) for women (American Cancer Society 1998). A 1×10^{-6} excess cancer risk represents an additional one-in-one-million probability that an individual may

develop cancer over a 70-year lifetime as a result of the exposure conditions evaluated. Noncancer effects are expressed as the ratio of the estimated exposure, or intake rate over a specified exposure period, to the RfD derived for a similar exposure period. This ratio is termed a hazard quotient. Exposures resulting in a hazard quotient less than or equal to 1 are unlikely to result in noncancerous adverse health effects.

Estimated total cancer risks for both reasonable maximum exposure (RME) and typical scenarios were within the 10^{-6} to 10^{-4} target risk range identified above. Specific results for each scenario were as follows:

For the developed area:

- Under current conditions in the developed area, the long-term worker scenario had a *cumulative* risk estimate of 4×10^{-5}, due primarily to arsenic in water, and arsenic and PAHs in soil.
- Under hypothetical future conditions in the developed area, the long-term worker scenario had the same *cumulative* risk estimate as did the long-term worker under current conditions (i.e., 4×10^{-5}), due primarily to arsenic in water and arsenic and PAHs in soil.

For the undeveloped area:

- Under hypothetical future conditions in the undeveloped area, the RME risk estimate for a long-term worker's ingestion of surface soil was 9×10^{-6}, and dermal contact with soil was 1×10^{-5}; both were related primarily to arsenic and PAHs.
- The highest *cumulative* risk estimate for a receptor was the combined estimate of 5×10^{-5} for a hypothetical future long-term worker in the undeveloped area, related to groundwater and soil contact with arsenic and PAHs. This risk estimate is less than the upper limit of the acceptable risk levels identified by EPA.

- The highest *pathway* risk estimate for a receptor was 3×10^{-5} for the hypothetical future use of groundwater as workplace drinking water, due primarily to arsenic in groundwater (i.e., the arsenic risk estimate was 2.7×10^{-5}).

- Current trespassers on the undeveloped area had *cumulative* risk estimates of 2×10^{-6}, for contact with soils. The total cumulative estimate for trespassers to the West Ditch or the onsite basin was 1×10^{-6}. Risks for this scenario were also related primarily to arsenic and PAHs in soil and sediments.

- All risk estimates for current and future contact with surface water in the undeveloped area were well within acceptable levels.

For the developed and undeveloped areas:

- All risk estimates for the construction workers were below 1×10^{-6}, indicating that potential risks related to human contact with subsurface soils are well within acceptable levels identified by EPA.

For noncarcinogens, no current exposure scenarios had hazard indices greater than 1. In the future scenarios, the long-term worker was the only receptor with hazard indices greater than the threshold of 1. Results for the future scenarios for the long-term worker were as follows:

- The highest estimated hazard index was 3.9 for ingestion of surface soil in the developed area, based almost entirely on mercury in soil. If the single highest value of 13,800 mg/kg at SS-04 were to be applied as the exposure point concentration for surface soils in the developed area, the hazard index would be 22.5.

- Mercury in soil was also the primary contributor to a hazard index of 1.1 for long-term worker's exposure to surface soil in the undeveloped area.

- Future hypothetical ingestion of groundwater site wide had a hazard index of 3.4 based on mercury, manganese, arsenic, and iron.

- The *cumulative* hazard indexes for long-term workers in the developed and undeveloped areas were 7.3 and 4.5, respectively, related to mercury in soils and mercury and other metals in water.

Although the risk and hazard estimates for several hypothetical pathways exceeded the lower end of the acceptable target range identified by EPA, these findings should be considered within the context of uncertainties related to the estimation methods. Mercury and arsenic were responsible for the majority of site risks. The potential for overestimation of OU1 risks related to exposure assumptions and to the toxicity value for mercury derived through application of a 1000-fold uncertainty factor, suggest that risks may be lower than the RME estimates provided here. Furthermore, EPA indicates that the range of possible values around RfDs such as that used to evaluate inorganic mercury is "perhaps an order of magnitude." Thus, the hazard quotients estimated here for mercury in soil can be considered in this light.

In addition, although site-specific background concentrations were not available, concentrations of arsenic in OU1 soil were similar to those identified in background locations in suburban New Jersey. Thus, risks related to arsenic in OU1 soil would not be expected to differ substantially from estimates derived for typical background locations. Moreover, many of the potential exposure pathways considered here are entirely hypothetical. In particular, use of groundwater as drinking water is highly unlikely and is considered here only for risk assessment purposes.

1 Introduction

On behalf of Morton International and Velsicol Chemical Corporation (Velsicol), Exponent has prepared a draft human health risk assessment (HHRA) for the Ventron/Velsicol site located in Wood-Ridge and Carlstadt, New Jersey. The objective of the baseline HHRA is to quantify human health risks associated with chemicals of potential concern (CoPCs) in the absence of any remedial action (i.e., under the no-action alternative). This HHRA constitutes Section 6 of the remedial investigation (RI) report for Operable Unit 1 (OU1) of the Ventron/Velsicol site (Exponent 2000) and relies on data collected during that investigation. The assessment was conducted consistent with U.S. Environmental Protection Agency (EPA) and New Jersey Department of Environmental Protection (NJDEP) guidance, with the 1996 work plan for the site (CRA 1996), and with ongoing communication between Exponent staff and EPA and NJDEP on behalf of Morton International and Velsicol. An ecological risk assessment (ERA) has also been prepared under separate cover (Exponent 2001).

The risk assessments are part of the remedial investigation and feasibility study (RI/FS) required by the "Resolution of the Berry's Creek/Wood-Ridge Site Action Committee" (Resolution) with the New Jersey Department of Environmental Protection (NJDEP), executed on August 15, 1996. The Resolution is an amendment to the October 26, 1984 "Stipulation and Supplementary Order Approving Cooperative Agreement for Remedial Investigation and Feasibility Study and Amending Procedural Order Involving Remedy" (Stipulation). The Stipulation covers the approximately 38-acre Ventron/Velsicol site and the areas of Berry's Creek that are potentially affected by industrial activity at the site, while the Resolution provides for implementation of a separate RI/FS for the Ventron/Velsicol site. The Ventron/Velsicol site is designated as a National Priorities List (NPL) site identified by the U.S. Environmental Protection Agency (EPA) number NJD980529879, and bearing Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) ID number 02C7.

This document presents the results of the draft HHRA for Operable Unit 1 (OU1) of the Ventron/Velsicol site (referred to in this report as the "site") and it supplements the RI for the site (Exponent 2000). This HHRA was conducted using analytical results from samples of soil, groundwater, water from seeps, sediments, and air collected during Phase I and Phase IA of the RI. The HHRA also draws on information presented in the RI report on site background, hydrology, climate, and demographics. This HHRA is structured in accordance with the guidance for risk assessment as discussed in the specific sections on human health risk assessment (Section 3) under the EPA Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (U.S. EPA 1988) and within NJDEP. This section provides a brief description of the site, applicable guidance documents, and the organization of this report and appendices. Section 2 describes the conceptual model, and the remainder of the report describes the methods and findings of the HHRA.

1.1 Site Description

The Ventron/Velsicol site is located in Bergen County, New Jersey, within the boroughs of Wood-Ridge and Carlstadt (Figure 1-1). In accordance with instructions in an April 1, 1999 letter from NJDEP (Zervas 1999, pers. comm.), the site has been divided into two operable units: OU1 and OU2 (Figure 1-2), of which only OU1 is addressed here. The two operable units together make up an irregularly shaped, approximately 38-acre parcel within an industrialized area of northeastern New Jersey. Approximately 15.7 of the 38 acres are within the Borough of Wood-Ridge, and the remaining 22.6 acres are within the Borough of Carlstadt. The entire site is generally within the Hackensack Meadowlands area, and the portion in Carlstadt is within the jurisdiction of the Hackensack Meadowlands Development Commission (HMDC). The site is bordered to the east by Berry's Creek; to the west by the West Ditch, the Diamond Shamrock/Henkel and Randolph Products properties, and Park Place East; to the south by the Diamond Shamrock/Henkel Ditch (south) and Nevertouch Creek; and to the north by Ethel

Boulevard and a railroad track (Figure 1-2). Two active commercial/industrial facilities and an empty lot, on which a publicly owned treatment works (POTW) was formerly located, lie immediately north of Ethel Boulevard and the railroad track. The railroad crosses Berry's Creek at the northeast corner of the site and continues south along the eastern side of Berry's Creek.

Land use in the immediate vicinity of the site is primarily commercial/industrial. Teterboro Airport is approximately 0.6 miles to the north, State Highway 17 is approximately 500 ft to the west, and the Meadowlands Sports complex is approximately 1 mile to the south. The immediately adjacent Diamond Shamrock/Henkel property is undergoing an active remediation program under the NJDEP Environmental Cleanup Responsibility Act. The closest residential area is approximately 750 ft to the north. Additional information on topography and surface features, climate and meteorology, geologic setting, soils, hydrology, hydrogeology, ecology, demography, and land use is available in the RI report (Exponent 2000).

As indicated above, the site is divided into two units—OU1 and OU2—and only OU1 is evaluated herein. OU1 includes two areas—one developed and one undeveloped (Figure 1-2). The developed portion of OU1 covers approximately 7 acres and includes two active warehouses—the Wolf and U.S. Life Warehouses (Figure 1-2). The former mercury processing facility was located on the portion of OU1 that is now occupied by these warehouses. The remainder of the developed area of OU1 is covered with asphalt pavement or with gravel, which forms the bed for railroad tracks located immediately behind the warehouses. The only soil in the developed area that is not covered by pavement is beneath the gravel bed of these railroad tracks. Drainage from the developed area is directed generally between the two warehouses and the Randolph Products property, and it flows in the West Ditch (Figure 1-2) along the western property boundary.

The undeveloped area of OU1 lies generally south of the developed area and includes approximately 19 acres of land that was filled but not developed. This portion of OU1 is bordered to the north by the railroad track, to the south by the Diamond Shamrock/Henkel Ditch (north), to the west by the West Ditch, and to the east by Berry's Creek (Figure 1-2). The undeveloped filled area of OU1 is characterized by mixed vegetation and a variety of surficial debris. Much of this area is relatively flat, but the northeast portion has uneven terrain. Two surface features are a small pit, which may include remnants of an access structure for the drainage system from the Plant area that extended to Berry's Creek, and a small basin, hereafter referred to as the onsite basin. The onsite basin may be a remnant of a settling basin for discharges from the Plant area or the Randolph Products property (Figure 1-2). The east and south perimeters of this area are steep stream banks adjacent to Berry's Creek and the Diamond Shamrock/Henkel Ditch (north), respectively. The north and west perimeters of the area are fenced; additional fencing to the east prevents site access via the tide gate.

The remaining 12 acres of the site are within OU2 and are located south of the undeveloped filled area (Figure 1-2); this are is not considered further herein.

1.2 Applicable Guidance

The risk assessment was conducted in accordance with current NJDEP and EPA guidance, including, but not limited to, the following documents:

- *Soil Cleanup Criteria. Non-residential and residential direct contact soil cleanup criteria* (cleanup standards for contaminated sites N.J.A.C. 7:26). http://www.state.nj.us./dep/srp/regs.htm. State of New Jersey, Department of Environmental Protection, Trenton, NJ

- *Risk Assessment Guidance for Superfund: Volume 1 — Human Health Evaluation Manual* (Parts A, B, C, and D) (U.S. EPA 1989, 1998b, 1999a,b)
- EPA Region IX preliminary remediation goals table (U.S. EPA 2001a)
- *Risk Assessment Guidance for Superfund – Supplemental Guidance: Dermal Risk Assessment – Interim Guidance* (Final Draft) (U.S. EPA 1999a)
- *Supplemental Guidance to RAGS: Calculating the Concentration Term* (U.S. EPA 1992)
- *Exposure Factors Handbook* (U.S. EPA 1997a)
- *Guidance for Data Usability in Risk Assessment* (U.S. EPA 1990a).

These documents were included in the revised list of guidance documents submitted to NJDEP in January 2001 (Hock 2001, pers. comm.).

1.3 Organization

Site background information and applicable guidance documents were summarized in Sections 1.1 and 1.2. Sections 2 through 6 describe the results of the four steps recommended in EPA guidance for risk assessment:

- Data evaluation and identification of CoPCs
- Exposure assessment
- Toxicity assessment
- Risk characterization.

An uncertainty assessment is included in the risk characterization to place potential risks in context. The uncertainty assessment discusses HHRA assumptions that may lead to over- or underestimates of potential site risks. The following supporting information is provided in appendices to the HHRA:

- **Appendix A, Data Analysis** serves as the basis for selecting CoPCs by summarizing all data reviewed in the HHRA and comparing OU1 media concentrations with risk-based concentrations (RBCs). This appendix also shows background concentrations identified for inorganic compounds in New Jersey soils and presents exposure point concentrations used in the HHRA.
- **Appendix B, Region IX Tables of Screening Values**, provides tables of EPA-derived risk-based concentrations used in the selection of CoPCs (U.S. EPA 2001a) (as requested by EPA Region II).
- **Appendix C, Risk Characterization Tables**, presents results of the risk calculations, including exposure point concentrations, chronic daily intake (CDI) estimates, and risk estimates for each potentially complete exposure pathway.

2 Conceptual Site Model

In January 2001, Exponent submitted a draft human health and ecological conceptual model for OU1 of the Ventron/Velsicol site on behalf of Morton International and Velsicol (Henry 2001, pers. comm.). This conceptual site model was developed based on site history, site conditions, and the analytical results of site media samples presented in the RI report (Exponent 2000). The conceptual site model identifies potential sources, transport mechanisms, exposure media, exposure routes, and human and ecological receptors. These elements of the conceptual site model are summarized below, followed by a discussion of the relationships among these elements. Figure 2-1 provides an overview of the conceptual models for human receptors. Ecological receptors are described in more detail in the BERA (Exponent 2001a). In addition, Chapters 4 and 5 of the RI report provide a detailed description of the nature and extent of contamination, and of the transport and fate of CoPCs, respectively.

2.1 Sources and Transport Pathways

As described in the RI, possible sources of CoPCs were former operations within the developed areas and direct disposal of wastes and fill in the undeveloped area. The main operations within the developed area were the manufacture and reclamation of mercury compounds. Metals and any other process-related chemicals could have been deposited on soils through leaks, spills, and past waste handling practices. The undeveloped area (an approximately 19-acre area between the developed area and Berry's Creek) was used as a disposal area for various materials, including demolition material and domestic solid waste.

Possible release mechanisms for the CoPCs include potential spills and leaks of chemicals managed in the developed area (although none have been documented) and

previous activities in the area. Within the undeveloped area, release mechanisms include direct disposal and subsequent leaks from any containers. Where releases to soil occurred, the secondary transport mechanisms for CoPCs include potential infiltration and percolation to subsurface soil and shallow groundwater, stormwater runoff, and windborne dust and/or volatile emissions.

Offsite transport of chemicals in soil via stormwater runoff may have resulted in releases to surface water within OU1 (i.e., the West Ditch and the onsite basin), or to OU2 (i.e., the Diamond Shamrock/Henkel Ditches [north or south] and Berry's Creek).

Volatilization of chemicals from soil or shallow groundwater to air, and to a lesser extent, the suspension of fine soil particulates, are also potential transport pathways. Due to the presence of soil coverage within the developed area, air pathways are expected to be less significant than direct-contact pathways (i.e., ingestion and dermal absorption).

2.2 Potential Human Receptors and Pathways

A complete exposure pathway exists only when a receptor population can be exposed to chemical constituents. OU1 is currently under commercial use within the developed area and is fallow within the undeveloped area. Wood-Ridge has zoned this area as "light industrial park" (Kolicko 1997, pers. comm.), so future residential use is considered unlikely. Given the characteristics of the property, including current use and zoning regarding future use, the most likely potential human receptors include onsite workers and trespassers who might visit the site. Onsite workers are likely to be the receptor population with the highest exposure potential. Although offsite residents could potentially inhale fugitive dust generated from the site, the magnitude of exposure via this pathway would be far less than for onsite workers.

CoPCs have been detected in OU1 soil, groundwater, sediments, and surface water. The current potential for exposure to site media is low, because the site is fenced on three

sides, and because the developed area is largely covered by buildings and pavement. Potential for receptors to contact CoPCs in each of the media will be evaluated. Figure 2-1 is a schematic representation of these potential exposure pathways.

2.2.1.1 Current and Future Workers

Current and future onsite worker scenarios were evaluated for the developed area, in which workers are exposed to surface soil via ingestion, dermal contact, or to a lesser extent, inhalation. As indicated above, the developed area is nearly all paved. Therefore, in the current scenario for the developed area, only unpaved soils were considered. In contrast, a future worker scenario for the developed area included consideration of paved and unpaved soils. A future worker scenario was also evaluated for the undeveloped area. Although future development is unlikely to take place without surface soil modification (i.e., adding fill), such use was evaluated in a hypothetical scenario for purposes of risk assessment. Risks associated with exposure to CoPCs in subsurface soil were evaluated through a current and future trench worker scenario, in which workers contact CoPCs in subsurface soil through incidental ingestion, inhalation, and dermal contact.

As discussed above, site groundwater is not used as drinking water, and such use is not expected in the future. However, to determine whether use of groundwater as drinking water could result in unacceptable risks, this pathway was evaluated for workers in a hypothetical future scenario, although such is highly unlikely.

2.2.1.2 Trespassers

The most likely current receptor within the undeveloped area would be a trespasser who might gain access. Potential exposure pathways would include ingestion of and dermal contact with surface soil, sediments, and surface water within the undeveloped area. The most likely human populations to trespass in and around the undeveloped area are adults

and older children (i.e., 9–18 years old). Younger children would not be expected to visit these areas given the limited access.

Although it is hypothetically possible for chemicals in site soil and surface water to be taken up into plants or into aquatic organisms consumed by trespassers, these pathways are considered incomplete because of the site characteristics and the quality of the vegetation and conditions at the site. During the site visits, no edible plants were noted. The surface water within the OU1 area, the West Ditch, and the onsite basin was not determined to support fish or other aquatic organisms that would be consumed by people. Therefore, this pathway is not considered complete.

3 Data Analysis and Identification of Chemicals of Potential Concern

The HHRA uses a conservative screening process to select CoPCs to ensure that any substances that could be of concern are evaluated fully. All available chemical concentration data were reviewed to identify CoPCs in the following media:

- Surface soil/sediments
- Subsurface soil
- Surface water
- Groundwater
- Air.

As described in the RI report (Exponent 2000), drums and test pits containing waste material were sampled and analyzed during the remedial investigation. These samples cannot reasonably be characterized as soil and are not evaluated in this HHRA. These materials will be addressed in the feasibility study.

Table 3-1 shows the CoPCs identified for the various media. The list of CoPCs derived through the identification process described herein for human health risk assessment is more inclusive than that presented in the RI report (Exponent 2000). Tables A-1 through A-6 provide a summary of OU1 data and data analyses and have been prepared in the format of Risk Assessment Guidance for Superfund (RAGS) Part D, Table 2.1 (U.S. EPA 1998b). They present the occurrence, distribution, and selection of CoPCs and provide the following information as specified in U.S. EPA (1998b):

- Chemicals detected and undetected in each medium
- Frequency of detection of chemicals in each medium

- Range of detected concentrations for each chemical in each medium
- Range of detection limits for the chemicals in each medium
- Background screening values for metals in suburban New Jersey soils (for comparison only) (NJDEP 1993)
- Screening concentrations (i.e., risk-based concentrations [RBCs]), when available, for exposure to residential soil, for residential use of drinking water or for inhalation.

Tables A-7 through A-13 present exposure point concentrations calculated for each CoPC in each exposure medium and additional supporting documentation consistent with EPA guidance (U.S. EPA 1998b). Figure 3-1 shows sample locations for data used in the HHRA. The following sections describe how OU1 data were used to identify CoPCs.

Analytical results from OU1 media were reviewed to determine a list of substances that may be of concern for human health. The methods used to select CoPCs were intended to ensure that no contaminants detected at levels of potential health concern would be excluded. Concentrations of contaminants in all media were compared with conservative RBCs derived by EPA. RBCs used in this screening process were developed by EPA Region IX. The RBCs for soil account for three potential exposure routes: ingestion, inhalation of particles or vapors, and dermal contact. The RBCs for tap water account for ingestion of water and inhalation of volatiles from water. RBCs for ambient air (in a residential setting) were used to screen the air data (U.S. EPA 2001a). The RBCs correspond to either a 1×10^{-6} excess cancer risk (for carcinogens) or a hazard quotient of 0.1 (for noncarcinogens), whichever is more stringent (U.S. EPA 2001a). Appendix B includes copies of the original sources of EPA risk-based concentrations used in screening CoPCs.

Data on site-specific background concentrations of inorganic chemicals were not available. Comparison of site concentrations with samples collected from background

locations in New Jersey soils suggests that site concentrations for some inorganic chemicals are within concentrations typically identified in background soils. EPA staff have indicated that chemicals should not be screened out of the risk assessment based on their presence at background concentrations. Instead, the concentration relative to background can be considered as part of risk management decision-making at the site (Sivak 2001, pers. comm.). The uncertainty assessment includes a discussion of site concentrations relative to background concentrations. As indicated there, some of the risks identified in the assessment may be related to naturally occurring chemicals in soil. The contribution to site risks related to background concentrations should be considered in evaluating the need for site remediation or site controls.

Data for surface soil/sediments and subsurface soils in the developed and undeveloped areas were compared with EPA-derived RBCs for residential soil as a conservative means of evaluating direct contact with these media. Use of the RBCs derived for residential soil to screen for CoPCs in these media is highly conservative, because these values are based on daily contact with soil in a residential scenario, whereas exposures to soil/sediments would be restricted to occasional contact during trespassing activities, or short durations during construction activities. Such exposures would be expected to be much less frequent than exposures that a child might receive at a residence. Consequently, the total exposure to these soil/sediments would be expected to be at least an order of magnitude less than exposure to soil in a residential scenario.

Contaminant concentrations in surface water (the onsite basin and the West Ditch) and OU1 groundwater were compared with RBCs derived by EPA based on assumed levels of exposure resulting from the use of water as a residential drinking water source. This method is a highly conservative screening procedure, because no site surface water or groundwater is used for drinking water. Similarly, concentrations of mercury detected in outdoor air were screened through comparison with an RBC derived on the basis of exposure to air in a residential setting (U.S. EPA 2001a).

Consistent with guidance contained in U.S. EPA (1989), data were also evaluated in light of the following considerations:

- Although EPA indicates that chemicals can be excluded based on frequency of detection, no chemicals were excluded on this basis, because no chemicals that were detected had low detection frequencies.
- A compound can be eliminated from consideration if it is an essential nutrient, present at low concentrations, and toxic only at high doses. Consistent with EPA guidance (U.S. EPA 1989), several essential nutrients (i.e., calcium, magnesium, potassium, sodium) were not included as CoPCs.
- If common laboratory chemicals (e.g., acetone, methylene chloride, toluene, phthalate esters) are found at less than 10 times the maximum concentration detected in any blank, or if other chemicals are found at less than 5 times the maximum concentration detected in any blank, these chemicals can be eliminated. No chemicals were excluded on this basis.

After consideration of the issues described above, chemicals were identified as CoPCs if the maximum concentration detected in an environmental medium exceeded the respective RBC.

3.1 Soil and Sediment

The soil data were considered in three groups: surface soils in the developed area, surface soils in the undeveloped area, and subsurface soils. Data for sediment samples in the undeveloped area were also screened for CoPCs. The screening of these data is discussed in the following sections.

Surface soils in developed area—Up to 15 samples were collected from the developed soil area at 0–12 inches deep. Because the developed area is nearly all paved, only three of these samples were from unpaved areas; these were collected under gravel in the railroad bed. As described above in the conceptual model, the unpaved soils within the developed area were considered in a current worker scenario, while unpaved and paved soils together were considered in a future scenario. Therefore, given these different expected exposure patterns for current and future use, separate exposure point concentrations were calculated for the combined paved and unpaved soils and for the paved soils alone.

Nine metals were identified as CoPCs in surface soils within the unpaved soils in the developed area: aluminum, arsenic, chromium, copper, iron, lead, manganese, mercury, and vanadium. Four PAH compounds exceeded their RBCs and were identified as CoPCs: benz[a]anthracene, benzo[b]fluoranthene, benzo[a]pyrene, and dibenz[a,h]anthracene. All other organic compounds were found in concentrations less than their RBCs (Tables 3-1 and A-1).

Considering the paved and unpaved soils together, all the same CoPCs were found, with two additional CoPCs: thallium and benzene were also present at concentrations greater than their RBCs and were included as CoPCs within the future scenario for exposure to paved and unpaved soil together within the developed area.

Surface soil and sediment in undeveloped area—Up to 40 samples were collected from the undeveloped soil area at the 0- to 12-in. depth. These included sediment samples collected at five locations in the onsite basin, and the West Ditch. Of the inorganic compounds detected in the undeveloped area surface soils, beryllium, calcium, cobalt, magnesium, methylmercury, potassium, selenium, and sodium were found at concentrations less than their RBCs. Thus, 16 metals were identified as CoPCs in surface soils within the undeveloped area: aluminum, antimony, arsenic, barium, cadmium,

chromium, copper, iron, lead, manganese, mercury, nickel, silver, thallium, vanadium, and zinc (Tables 3-1 and A-2).

Of the 34 organic compounds detected, eight compounds or mixtures exceeded their RBCs. These included five carcinogenic and one noncarcinogenic PAH compounds (benz[a]anthracene, benzo[b]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene, and phenanthrene). Thus, six PAH compounds (see list above), plus bis[2-ethylhexyl]phthalate and PCBs (Aroclors® 1248 and 1260), were identified as CoPCs (Tables 3-1 and A-2).

Subsurface soils in undeveloped area—Screening of subsurface soils was conducted for all subsurface samples together (i.e., developed and undeveloped areas combined). Up to 130 subsurface soil samples were taken from depths of 1–20 ft bgs. Sixteen metals were identified as CoPCs in subsurface soils: aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, thallium, vanadium, and zinc. Six carcinogenic PAHs (benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene) and four noncarcinogenic PAHS (2-methylnaphthalene, benzo[ghi]perylene, naphthalene, and phenanthrene) were identified as CoPCs. Four additional organic chemicals identified as CoPCs were PCBs, carbazole, benzene, and toluene (Tables 3-1 and A-3).

3.1.1 Surface Water

Chemicals in surface water were compared with EPA Region IX RBCs based on residential drinking water consumption (U.S. EPA 2001a). Screening of surface water in OU1 was conducted for all samples together. Surface water samples from five stations in the West Ditch and the onsite basin were evaluated. Four metals were identified as CoPCs in surface water: iron, lead, manganese, and mercury. No organic chemicals were identified as CoPCs (Tables 3-1 and A-4).

3.1.2 Groundwater

Screening of groundwater in OU1 was conducted for all samples site wide. Groundwater samples were collected from the 15 monitoring wells located in the developed and undeveloped filled areas. Ten metals were identified as CoPCs in groundwater: arsenic, barium, cadmium, copper, iron, manganese, mercury, nickel, thallium, and vanadium. Two noncarcinogenic PAHs (2-methylnaphthalene and naphthalene) were identified as CoPCs. In addition, eleven organic chemicals or chemical classes were identified as CoPCs: bis[2-ethylhexyl]phthalate, 1,4-dichlorobenzene, 4-methylphenol, 1,2-dichlorothene, 4-methyl-2-pentanone, acetone, benzene, chlorobenzene, chloroethane, toluene, and xylene (Tables 3-1 and A-5).

3.1.3 Air

Mercury vapor was identified as a CoPC in outdoor air. No CoPCs were identified in indoor air (Tables 3-1 and A-6). Air samples were collected during the Phase I field investigation, during the warehouse evaluation study, and by NJDEP. During the Phase I investigation, particulate mercury and total gaseous mercury were measured in five samples collected in September and October of 1997, and total gaseous mercury was measured in six samples collected in March 1998. In the supplemental warehouse study, gaseous mercury was measured at three locations inside the U.S. Life (Jerbil) Warehouse and at two outside locations in April 1999. Both particulate and gaseous mercury were measured by the NJDEP in 1989 and 1990. Six samples were taken at three locations within OU1, one of which was above the limit of detection. Given the uncertainty in the early data regarding sampling methods, and the availability of 16 samples from a recent investigation, the single detected sample was not included in this HHRA.

4 Exposure Assessment

Exposure assessment is the process of identifying human populations that could potentially contact site-related chemicals and estimating the magnitude, frequency, duration, and route(s) of potential exposures. In the HHRA, potential OU1 risks were evaluated in hypothetical current and future workplace scenarios, and in a future trespasser exposure scenario. In addition, potential exposure to subsurface soil was considered for a construction worker. A residential population was not considered here, given the nature of the area (i.e., limited zoning and access), which makes future residential development unlikely. This section describes how these scenarios were selected as a conservative means of estimating current and hypothetical future exposures and potential risks. First, the exposure setting was characterized, and potentially exposed populations were identified (i.e., trespassers and workers). Next, potential exposure pathways were identified, and the methods and assumptions for quantifying exposure were presented. It should be noted that some of the pathways considered are highly unlikely (e.g., groundwater use as drinking water and trespassing on the site), but were considered here for risk assessment purposes.

4.1 Exposure Setting and Receptor Populations

Given the OU1 characteristics, current use, and zoning regarding future use, the most likely potential human receptors include onsite workers and trespassers who might visit OU1. Onsite workers are likely to be the receptor population with the highest exposure potential. Although offsite residents could potentially inhale fugitive dust generated from OU1 media, the magnitude of exposure via this pathway would be far less than for onsite workers.

CoPCs have been detected in OU1 soil and groundwater, and in sediments and surface water within OU1. The current potential for exposure to media at OU1 is low, because it

is fenced on three sides and the developed area is largely covered by buildings and pavement. The potential for receptors to contact CoPCs in each of the media was evaluated.

4.2 Potential Exposure Pathways

This section identifies potential exposure pathways for CoPCs found in environmental media. An exposure pathway is the course a chemical takes from a source to an exposed receptor. Exposure pathways consist of the following four elements: 1) a source; 2) a mechanism of release, retention, or transport of a chemical in a given medium (e.g., air, water, soil); 3) a point of human contact with the medium (i.e., exposure point); and 4) a route of exposure at the point of contact (e.g., incidental ingestion, dermal contact). If any of these elements is missing, the pathway is considered incomplete (i.e., it does not present a means of exposure). Only those exposure pathways judged to be potentially complete are quantified in the HHRA. Table 4-1 summarizes the exposure pathways evaluated in the HHRA and is consistent with Table 1 of U.S. EPA (1998b).

At least one CoPC has been detected in each of the media evaluated—surface soil, subsurface soil, surface water, groundwater, and air. As described above, the most likely means for human exposure to these CoPCs is through workplace use of, or trespassing on, these areas. Opportunities for exposure to CoPCs are generally very low because of the limited access to any site area and to surface soil within the developed area.

4.3 Quantification of Exposure

In this section, CoPC intakes for chronic exposures are estimated for the exposure pathways identified in the previous section. CoPC intakes are based on estimates of exposure concentrations at the exposure point (i.e., exposure point concentrations) and on the estimated magnitude of exposure to CoPC-containing media. Exposure estimates for

chronic daily intakes (CDIs) are defined as the mass of a CoPC taken into the body, per unit of body weight, per unit of time. For dermal contact, exposures are expressed as absorbed dose rather than administered dose.

The averaging time used to determine a CDI depends on the type of toxic effect being assessed. For carcinogenic effects, CDIs are calculated by averaging the total cumulative dose over a lifetime. The estimate of the average lifespan is assumed to be 70 years, based on EPA guidance (U.S. EPA 1991).[1] For assessing noncancer effects, CDIs are calculated by averaging intakes only over the period of exposure. The distinction between these two approaches is based on EPA's currently held opinion that the toxicological mechanisms of action are different for carcinogenic and noncarcinogenic processes.

Intakes of CoPCs were estimated using algorithms and assumptions consistent with EPA guidance (e.g., U.S. EPA 1989) for the following potential exposure pathways:

- **Surface soils in developed area**: Incidental ingestion, and dermal contact with CoPCs by long-term workers and construction workers
- **Surface soils in undeveloped area**: Incidental ingestion, dermal contact, and inhalation of CoPCs by long-term workers, construction workers, and trespassers who might visit OU1
- **Subsurface soils in developed and undeveloped areas:** Ingestion and dermal contact with CoPCs in subsurface soils by construction workers

[1]EPA's most recent edition of the *Exposure Factors Handbook* (U.S. EPA 1997a) recommends use of 75 years for the average value for life expectancy; however, the original 70-year value is used in this risk assessment for consistency among risk assessments, and because some of the carcinogenic slope factors and unit risks (see Section 5) are derived based on a 70-year lifetime, and the difference (error) between the two values is low.

- **Groundwater:** Ingestion and dermal contact of CoPCs in groundwater are evaluated in a hypothetical OU1-wide future long-term worker scenario
- **Surface water and sediments in OU1:** Incidental ingestion and dermal contact with surface water by a trespasser who might contact CoPCs in the onsite basin and the West Ditch
- **Outdoor air:** Inhalation of outdoor air by long-term workers in the developed or undeveloped area.

Both reasonable maximum exposure (RME) and typical estimates were calculated. EPA describes RME as the highest exposure that is reasonably expected to occur at a site (U.S. EPA 1989). EPA, in the *Final Guidelines for Exposure Assessment*, defines typical exposure as follows:

> The average [exposure or dose] estimate, used to describe the arithmetic mean, can be approximated by using average values for all the factors making up the exposure or dose equation (57 Fed. Reg. 104: 22888).

The following subsection presents the exposure algorithms and assumptions used to calculate CDIs for each of the exposure pathways listed above, and the methods used to calculate exposure point concentrations for the RME and typical cases.

4.3.1 Exposure Frequency and Duration and Receptor Characteristics

As described above, the most likely human populations to use the area are workers, although trespassers could also visit OU1. Worker scenarios considering exposure to surface and subsurface soil and to outdoor air were evaluated for the developed and undeveloped areas. In the developed area, current and future worker scenarios were

evaluated to consider current exposure to unpaved soil and future exposure to all soil (i.e., including soil now under pavement). A future long-term worker scenario was also evaluated for the undeveloped area. While future development as a workplace would likely require some modifications to the undeveloped-area soil, this hypothetical future scenario was evaluated under baseline conditions to determine whether site controls would be needed. The exposure frequency for the long-term worker in both the RME and typical scenarios was 250 days per year, as identified by EPA (U.S. EPA 1997a). The exposure duration for the worker is 25 years for the RME scenario, as identified by EPA (U.S. EPA 1991). For the typical scenario, a 6.6-year duration is applied. This provides a conservative means to evaluate exposure, because 6.6 years was identified as the median amount of time that workers spend in one occupation (U.S. EPA 1997a).

A construction worker scenario was also evaluated to consider hypothetical current or future contact with surface and subsurface soils in the developed and undeveloped areas. Construction workers were assumed to contact soils for 25 days/year in the RME, or 10 days/year in the typical scenario, over a 2-year construction period. The worker's body weight was assumed to be 70 kg.

A trespasser scenario was considered for the undeveloped area. The developed area has more limited access, and any risk for a trespasser who might gain access would be less than that estimated for a long-term worker. For the undeveloped area, the most likely trespassers are adults and older children (i.e., 9–18 years old). Younger children would not be expected to trespass within the area, given the limited access. In this assessment, trespassers were assumed to be exposed either to soils or sediment and surface water on a given visit. Trespassing within the undeveloped area is unlikely, and any occurrence is expected to be infrequent because of limited access, surrounding industrial development, and cold winter and fall weather. For an RME value, this assessment assumed one visit per week for the three summer months and one visit per month for two additional months in spring and fall, for a total of 14 visits per year. The HHRA assumed for the typical

scenario an average of one visit per month for the months of May through September, or a total of five visits per year.

Older children are assumed to visit OU1 areas as frequently as adults, but they have a somewhat higher exposure due to their lower body weight (i.e., 49-kg average for ages 9–18, in comparison to 70-kg average for adults). For the RME case, the HHRA assumed that adults might trespass within the area over a period of 30 years, while the typical exposure scenario assumed that both adults and older children may visit the West Ditch or onsite basin for a shorter period of 9 years.

4.3.2 Incidental Ingestion of Soils and Sediments

People visiting or working within OU1 may ingest surface soils or sediment as a result of direct contact with soil or sediment on the hands, followed by hand-to-mouth activity (either inadvertent or associated with eating or smoking). Surface soils in the undeveloped and developed areas, and sediments in the undeveloped area, were considered separately due to the differences in current and future use. As described above, sediment samples were collected in OU1 (West Ditch and the onsite basin). Tables 4-2 and 4-3 provide exposure assumptions for trespassers' exposure to soil and sediment, and Tables 4-4 and 4-5 provide exposure assumptions for long-term workers and construction workers, respectively.

Incidental ingestion of soil and sediment was evaluated using EPA guidance for risk assessment regarding soil ingestion. U.S. EPA (1997a) does not provide an upper-bound value for adults and older children. However, U.S. EPA (1991) has identified 100 mg/day as an upper-bound intake rate for adults. Therefore, this value was used as the intake rate for older children and adults in the RME trespasser scenario. For the RME worker scenarios, the assumption is made that half of this intake occurs at work, resulting in an RME intake for workers of 50 mg/day (U.S. EPA 1991). Consistent with EPA guidance, the mean value for adults of 50 mg/day was used in the typical trespasser

scenario for adults and older children, and in the typical scenario for workers (U.S. EPA 1997a).

4.3.3 Dermal Contact with Soils and OU1 Sediments

Tables 4-2 through 4-5 present the exposure algorithms for dermal contact with soils and OU1 sediments. Dermal exposure was expressed as an absorbed dose by incorporating a chemical-specific dermal absorption factor into the exposure equation. Dermal absorption factors reflect the desorption of the chemical from soil and the absorption of the chemical across the skin and into the bloodstream (U.S. EPA 1997a). Dermal absorption factors used in the HHRA are reported in Table 4-6. Consistent with guidance from U.S. EPA (1999a), where data for absorption from soil are not available, dermal exposure is evaluated qualitatively.

Surface area reflects the amount of skin exposed to a chemical in the exposure scenario. For an adult contact with outdoor soil exposure, U.S. EPA (1997a) recommends using 5,000 cm^2 as a central-tendency estimate and 5,800 cm^2 for an upper-bound estimate. These values represent 25 percent of the total body surface area for adults and were used in the estimates for adult trespassers. Further, EPA recommends deriving similar estimates for children by multiplying the 50th and 95th percentile total body surface areas from Tables 6-6 and 6-7 of the *Exposure Factors Handbook* (U.S. EPA 1997a) by 0.25 for the ages of interest. Thus, the HHRA assumed that 25 percent of the receptor's total body surface area potentially contacts CoPCs in undeveloped-area surface soils and sediments. This resulted in upper-bound and typical surface area estimates of 4,400 cm^2 and 3,600 cm^2, respectively, for children aged 9–18 years.

For workers, the RME value for adult workers of 3,300 cm^2 was applied, based on the average of the 50^{th} percentile of surface area of men and women over age 18, as shown in Tables 6-2 and 6-3 of U.S. EPA (1997a) and as recommended in U.S. EPA (1999a).

Consistent with guidance in U.S. EPA (1999a), this value was also conservatively applied in the typical case.

The soil-to-skin adherence factor refers to the amount of soil that remains deposited on the skin after contact. Adherence factors vary by soil type (e.g., moisture content, particle size), by the body part contacting the soil, and by the activity being conducted while in contact with the soil. Although U.S. EPA (1997a) reports that adherence factors for sandy sediments are likely to be less than for soils, because contact with water may wash the sediment off the skin, adherence to skin was assumed to be the same for soils and OU1 sediments in this HHRA. Adherence values were identified in the EPA's latest dermal guidance (U.S. EPA 1999a) and were applied in EPA Region IX screening values (U.S. EPA 2001a). RME and typical adherence factors for adults were both assumed to be 0.07 mg/cm^2. For older children, RME and typical adherence factors of 0.2 mg/cm^2 were assumed, based on data for children playing in wet soil (U.S. EPA 1999a).

For the construction worker scenario, the highest adherence factors for commercial/ industrial adults identified in the U.S. EPA (1999a) dermal guidance were applied. Specifically, the adherence factor for utility workers of 0.8 mg/cm^2, which was the highest 95th percentile adherence factor, was used for the RME, and 0.2 mg/cm^2, which was the highest 50th percentile factor, was applied for the typical scenario. Both of these factors were based on data from utility workers. For the long-term worker, an adherence value of 0.2 mg/cm^2 is applied in both the RME and the typical case, consistent with recommendations in U.S. EPA (1999a) and as applied in EPA Region IX screening values (U.S. EPA 2001a).

4.3.4 Incidental Ingestion of Surface Water

Tables 4-7 and 4-8 present the exposure algorithms for incidental ingestion of surface water while wading in the West Ditch or trespassing near the onsite basin. As described above, given the OU1 location, any trespassing in these areas would be expected to be

minimal. For the trespasser scenario, wading was assumed to represent the greatest exposure potential, because the OU1 surface water features are an unlikely location for trespassing and are too shallow for swimming. RAGS (U.S. EPA 1989) recommends a value of 50 mL/hour as the amount of water ingested while swimming. Based on professional judgment, the HHRA assumed that 25 percent of EPA's assumed water consumption rate for swimming, or 12 mL/hour, will be consumed while trespassing near the West Ditch or onsite basin. For the RME and typical scenarios, it was assumed that wading occurs 1 hour/day and 0.5 hour/day, respectively, based on best professional judgment. Trespasser receptors, exposure duration, and exposure frequency are the same as noted above.

4.3.5 Dermal Contact with Surface Water

Tables 4-7 and 4-8 present the algorithms for calculating the absorbed dose from dermal contact with surface water in OU1. Trespassers, older children, or adults visiting these areas are assumed to submerse the surface areas of their hands, forearms, feet, and lower legs, or approximately 25 percent of their total body surface area. As described above for dermal contact with sediments/soils, the resulting RME and typical estimates for surface area are 5,800 cm^2 and 5,000 cm^2, respectively, for adults, and 4,400 cm^2 and 3,600 cm^2, respectively, for older children.

The permeability constant reflects the rate of movement of the chemical across the skin. Permeability constants for all the CoPCs in surface water were taken from Table 3-1 (metals) or Appendix B (organic CoPCs) of U.S. EPA (1999a) and are shown in Table 4-6. All other exposure assumptions are the same as discussed above for ingestion of surface water.

4.3.6 Ingestion of and Dermal Contact with Groundwater

Table 4-9 presents algorithms that were used to calculate exposure to CoPCs via use of OU1 groundwater as drinking water. As described previously, such use is highly unlikely and is considered here for risk assessment purposes only. The intake of groundwater for the RME was assumed to be 1 L/day, based on the 2-L/day total intake of drinking water identified by EPA (U.S. EPA 1997a). This assumes that half of all water intake is consumed in the workplace. Similarly, the typical case assumed an intake of 0.7 L/day based on half of the 1.4-L/day mean value identified by EPA (U.S. EPA 1997a). Dermal contact with drinking water at the workplace is assumed to be limited to washing hands. The surface area assumed was derived from Table 6-4 of U.S. EPA (1997a) and represents the average of the maximum values for men and women (i.e., 977 cm^2, derived from 1,130 cm^2 and 824 cm^2) in the RME case, and the average of the mean values (i.e., 793 cm^2, derived from 840 cm^2 and 746 cm^2). Because hand washing involves a very brief exposure period, a fractional intake for dermal exposure to water of 0.03 was applied to represent about two minutes of exposure per day. Exposure frequency and duration assumptions are the same as those identified previously for long-term workers.

4.3.7 Inhalation of Vapors in Outdoor Air

Mercury vapor was the only CoPC identified for air. Table 4-10 presents the algorithm used to calculate exposure to mercury vapor in outdoor air. Exposure assumptions include an inhalation rate of 3.3 m^3/hr for the RME, which is the recommended upper-percentile rate for outdoor workers, and an inhalation rate of 1.3 m^3/hr for the typical case, which is the mean value identified by EPA (U.S. EPA 1997a). The time spent outdoors for both the RME and typical cases was assumed to be an average of 2 hours per day over the course of the year, based on best professional judgment. Exposure frequency and duration are the same as those identified for the long-term worker.

4.3.8 Exposure Point Concentrations

The exposure point concentration, or the concentration term in the exposure equation, is meant to reflect a representative concentration at the exposure point or points over the exposure period (U.S. EPA 1989). In evaluating the RME exposure scenario, EPA guidance specifies the use of the upper 95th percent confidence limit on the mean concentration, while average concentrations are used to quantify the typical scenario. In most situations, assuming long-term contact with the maximum concentration in any exposure medium is not reasonable. RAGS states that although the average concentration does not reflect the maximum concentration that could be contacted at any one time, it is regarded as a reasonable estimate of the concentration likely to be contacted over time (U.S. EPA 1989).

To evaluate exposures to CoPCs in OU1 media, concentrations in developed and undeveloped areas and within the OU1 soils, sediments, and surface water were each calculated separately to better represent likely future uses of these areas. Moreover, as described previously, exposure to developed-area soils was assessed separately for the current and the future scenarios to reflect current exposure to unpaved soil and future exposure to all surface soil, including soils now under pavement.

As part of data analyses conducted during the HHRA, data distributions in each affected environmental medium were evaluated, and distributions of each data set in each medium were determined. Where data sets had fewer than ten samples, the maximum concentration was used as the exposure point concentration for both the RME and typical case. Where data sets were larger than or equal to ten samples, the data distributions were statistically tested for lognormality or normality using the Kolmogorov-Smirnov goodness-of-fit test. Data were identified as best fitting a lognormal or a normal distribution.

In cases where neither a lognormal nor a normal distribution fit the data, or when both distribution types appeared to fit the data equally well, the data were identified as

following an unknown distribution. Consistent with U.S. EPA (1992) guidance, where distributions were unknown, calculations consistent with a lognormal distribution were applied.

Results of the calculation of the exposure point concentrations used in the HHRA are presented in Appendix A.

As recommended in RAGS, the 95-percent UCL of the arithmetic mean was used in estimating exposure concentrations for the RME scenarios because of the uncertainty associated with estimating the typical exposure concentration. Consistent with supplemental guidance to RAGS (U.S. EPA 1992), the UCL on mean concentrations was calculated as follows:

$$UCL = \exp\left(\bar{y} + \frac{S_y^2}{2} + \frac{S_y \times H}{\sqrt{n-1}}\right)$$

where:

n	=	number of observations
H	=	H statistic for a given confidence level, n, and S_y
exp	=	exponential function
$\bar{y}$	=	average of the log-transformed data ($y = \ln(x)$)
S_y	=	standard deviation of the log-transformed data.

Using the UCL on the mean concentration is a conservative method for evaluating exposure and risks. As noted in U.S. EPA (1992), a value other than the 95-percent UCL can be used, provided the risk assessor can document that high coverage of the true population mean occurs (i.e., the value equals or exceeds the true population mean with high probability).

Appendix A includes summaries of OU1 data and exposure point concentrations. In deriving exposure point concentrations for surface soil in the developed area, the maximum mercury value of 13,800 mg/kg was identified as the exposure point concentration (EPC [exposure point concentration] in table below), because it was lower than the 95% UCL calculated on this data set of 15 samples (see table below). When this sample was excluded, the maximum mercury value of 2,250 was identified as the EPC. The risk assessment results include risk estimates for worker contact with surface soil in the developed area, both with and without this sample result.

Total mercury in the developed area, with and without SS-04 (SS0038)

	No. of Results	Frequency of Detection	Minimum	Maximum	95% UCL	EPC
With SS-04	15	100%	9.3	13,800	15,541	13,800
Without SS-04	14	100%	9.3	2,250	5,884	2,250

Note: EPC - exposure point concentration
UCL - upper confidence limit

5 Toxicity Assessment

The purpose of a toxicity assessment is to evaluate the potential for CoPCs to cause adverse health effects in exposed persons and to thoroughly define the relation between the extent of exposure to a hazardous chemical and the likelihood and severity of any adverse health effects. The standard procedure for a toxicity assessment is to identify toxicity values for carcinogenic and noncarcinogenic effects and to summarize other relevant toxicity information. This section describes the methods used to evaluate toxicity that could result following oral or dermal exposure to CoPCs and provides a brief toxicity profile for inorganic mercury, which was a key CoPC in this risk assessment. Section 6.3, *Uncertainty Assessment*, also discusses uncertainties in EPA's toxicity value for inorganic mercury. EPA-derived toxicity values used in risk assessments are termed cancer slope factors (CSFs) and reference doses (RfDs). CSFs are used to estimate the incremental lifetime risk of developing cancer corresponding to CDIs calculated in the exposure assessment. The potential for noncarcinogenic health effects is typically evaluated by comparing estimated daily intakes to RfDs, which represent daily intakes at which no adverse effects are expected to occur over a lifetime of exposure. Both CSFs and RfDs are specific to the route of exposure (e.g., ingestion [oral] exposure). Currently, no CSFs or RfDs exist for dermal exposure; therefore, oral absorption factors were used to adjust CSFs and RfDs to assess dermal exposure, as described in the subsection below.

As indicated in RAGS (U.S. EPA 1989), the primary source for EPA-derived toxicity values is EPA's Integrated Risk Information System (IRIS) (U.S. EPA 2001b). This computerized database contains verified toxicity values in addition to up-to-date health risk and EPA regulatory information for many chemicals commonly detected at hazardous waste sites. EPA extensively reviews and verifies RfDs and CSFs derived for risk assessment, and once they are verified and posted in IRIS (U.S. EPA 2001b), they represent agency consensus. EPA's *Health Effects Assessment Summary Tables* (U.S. EPA 1997b), which are supposed to be updated quarterly, also provide EPA-derived toxicity values that may or may not be verified at the time of publication. Tables 5-1 and

5-2 show the toxicity values used in this risk assessment to assess carcinogenic and noncarcinogenic effects of CoPCs, respectively. These tables were prepared in a format consistent with RAGS Part D Tables 5.1 and 6.1, respectively.

5.1 Toxicity Assessment for Dermal Exposure

As noted previously, EPA has not developed any toxicity values for dermal exposure. EPA suggests, however, that dermal toxicity values can be derived from oral toxicity values for substances with systemic effects that are not dependent on route of administration (U.S. EPA 1989). In deriving such values, consistency is required between the type of dose that forms the basis of the oral toxicity value and the type of dose that will be calculated by the dermal exposure models. Specifically, a distinction must be made between an administered dose or intake (i.e., the amount of chemical taken into the body) and the absorbed dose (i.e., the amount of chemical that crosses body membranes and enters the blood stream).

Typically, oral toxicity values and CDIs for oral exposure are based on administered doses (or intakes); therefore, usually no adjustments are necessary to calculate risk estimates for oral exposures. However, because dermal exposures are usually expressed in terms of absorbed doses, dermal toxicity values must also be based on absorbed, rather than administered, doses (U.S. EPA 1989). To derive a dermal toxicity value for absorbed dose from an oral toxicity value based on administered dose, the oral toxicity value is adjusted by an estimate of the fractional oral absorption (i.e., the oral absorption factor). A CSF is divided by the oral absorption factor, and an RfD is multiplied by the oral absorption factor to calculate the adjusted toxicity value.

Only limited data are available to derive a technically supportable adjustment factor for an oral slope factor/RfD, to estimate a dermal toxicity value. Based on the current guidance (U.S. EPA 1999a), the only chemical for which an adjustment is recommended is cadmium. An oral absorption efficiency of 5% is assumed for cadmium, which leads to

an estimated dermal reference dose (RfDd) of 2.5×10^{-5} mg/kg-day—this value was used in the dermal risk assessment.

Dermal absorption through the skin is also a chemical-specific variable. The recent EPA dermal risk assessment guidance provides chemical-specific dermal absorption values for chemicals in soil and dust, including specific values for arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, tetrachlorodibenzo-*p*-dioxin (TCDD), PAHs, PCBs, and pentachlorophenols, and a default skin absorption fraction of 0.10 for nonvolatile organics. Of these, arsenic, cadmium, PAHs, PCBs, and numerous nonvolatile organics have been identified as CoPCs, and these chemicals were evaluated in the dermal exposure pathways for soil and sediments. Consistent with EPA guidance, remaining site CoPCs that have no identified absorption factors from soil or sediments were addressed qualitatively in the dermal assessment. Table 4-6 provides the oral absorption factors used for relevant CoPCs in this risk assessment; adjusted toxicity values are shown on Tables 5-1 and 5-2 and in the risk characterization tables presented in Appendix C.

5.2 Toxicity Profiles

Toxicity profiles provided by EPA in the IRIS database were referred to in preparing this assessment. These profiles can be accessed through the EPA web site (http://www.epa.gov/iris/subst/index.html). This section provides a brief summary of the EPA toxicity value for inorganic mercury (mercuric chloride), which is one of the main contributors to OU1 risk estimates.

Estimates of potential risks associated with inorganic mercury are based on EPA's current RfD of 0.0003 mg/kg-day, which is based on feeding and injection studies in rats. The RfD was derived by applying an uncertainty factor of 1000 to the lowest-observed-adverse-effect level identified from three studies. The primary adverse effect in these studies, identified at higher concentrations, was an autoimmune effect on the kidney. EPA indicated that no one study was sufficient to derive a toxicity value for inorganic

mercury. Specifically, there was no chronic oral study to apply as the basis for the RfD, and consequently, the RfD was based on a combination of studies conducted in a shorter time frame (subchronic studies) using both the oral and subcutaneous routes. EPA applied an uncertainty factor of 1000 to the lowest-adverse-effect level to account for the use of a subchronic study and the availability of a lowest-adverse-effect level (as opposed to a no-adverse-effect level), and to account for the relative increased sensitivity of human populations. The uncertainty assessment discusses uncertainties related to the application of this RfD in the risk assessment to evaluate chronic human exposure resulting from oral contact with mercury.

6 Risk Characterization

In risk characterization, quantitative exposure estimates and toxicity factors are combined to calculate numerical estimates of potential health risk. In this section, potential cancer and noncancer health risks are estimated assuming long-term exposure to CoPCs detected in OU1 media. As described in Section 4, *Exposure Assessment*, potential risks are estimated for the future worker and trespasser scenarios to provide a conservative means of considering possible future uses. The risk characterization methods described in RAGS (U.S. EPA 1989) are used to calculate potential RME and typical excess lifetime cancer risks for carcinogens, and hazard indices for CoPCs with noncancer health effects. These methods and the results of the risk characterization are described below.
Tables 6-1 and 6-2 show excess cancer risk estimates for the RME and typical scenarios, while Table 6-3 and 6-4 present RME and typical hazard indices. In addition, tables in Appendix D present detailed results of the risk calculations for each exposure pathway, including exposure point concentrations and CDIs calculated for the RME and typical scenarios, toxicity values used in risk estimates, and potential risk estimates for each CoPC in each exposure pathway.

6.1 Carcinogens

6.1.1 Methods

Quantifying total excess cancer risk requires calculating risks associated with exposure to individual carcinogens and aggregating risks associated with simultaneous exposure to multiple carcinogenic CoPCs. A cancer risk estimate for a single carcinogen is calculated by multiplying the carcinogenic CDI of the CoPC by its slope factor. A 1×10^{-6} cancer risk represents a one-in-one-million additional probability that an individual may develop cancer over a 70-year lifetime as a result of the exposure conditions evaluated. Because cancer risks are assumed to be additive, risks associated with simultaneous exposure to

more than one carcinogen in a given medium are aggregated to determine a total cancer risk for each exposure pathway. Total cancer risks for each pathway are then summed for reasonable combinations of exposure pathways, to determine the total cancer risk for the population of concern.

The likelihood that actual risks are greater than estimated risks is very low because of the conservative assumptions used to develop cancer risk estimates; in fact, actual risks may be significantly less than predicted values. EPA's *Guidelines for Cancer Risk Assessment* states, "...the linearized multistage procedure (typically used to calculate CSFs) leads to a plausible upper limit to the risk that is consistent with proposed mechanisms of carcinogenesis...The true value of the risk is unknown, and may be as low as zero" (51 Fed. Reg. 185:33992, 33998 [1986]).

Although the determination of an acceptable risk level is ultimately a decision to be made by risk managers, the findings presented here are compared with the range of acceptable risk levels cited in EPA's National Contingency Plan (NCP) (U.S. EPA 1990b), which EPA describes as the "blueprint for the Superfund law." The NCP states that risk levels in the range of 10^{-4} to 10^{-6} and lower are considered to be within the range of acceptable risks for Superfund sites. For perspective on background cancer risks, the lifetime risk of developing cancer in the U.S. population is approximately one in two (i.e., 5×10^{-1}) for men and approximately one in three (i.e., 3×10^{-1}) for women (American Cancer Society 1998).

6.1.2 Quantification of Carcinogenic Risks

Carcinogenic risk estimates were calculated for older children and adults in the RME and typical scenarios as the probability of additional cancers associated with the exposure pathways evaluated. Table 6-1 provides risk estimates for CoPCs in the RME scenario, and Table 6-2 provides a summary of risk estimates for all complete exposure pathways in the typical scenario. These tables also provide a summary of CoPCs that account for

90 percent of the risk estimates in each pathway. Tables 6-5, 6-6, and 6-7 provide estimates for chemicals in pathways with RME cancer risk estimates greater than 1×10^{-6} or hazard indices greater than 1. Estimated total cancer risks for both RME and typical scenarios were within the 10^{-6} to 10^{-4} target risk range identified above. The hypothetical future use of groundwater as workplace drinking water had the highest *pathway* risk estimate of 3×10^{-5}, due primarily to arsenic in groundwater (i.e., the arsenic risk estimate was 2.7×10^{-5}). The RME risk estimate for worker's ingestion of surface soil in the undeveloped area was 9×10^{-6}, and dermal contact with soil was 1×10^{-5}, both related primarily to arsenic and PAHs. The highest *cumulative* risk estimate for a receptor was the combined estimate of 5×10^{-5} for the worker in the undeveloped area related to groundwater and soil contact described above. The worker in both the current and future scenarios in the developed area had a similar *cumulative* risk estimate of 4×10^{-5}, due also primarily to arsenic in water, and arsenic and PAHs in soil.

Trespassers on the undeveloped area had *cumulative* risk estimates of 2×10^{-6}, for contact with soils. The total cumulative estimate for the hypothetical trespassers within the West Ditch or the onsite basin was 1×10^{-6}. Risks for this scenario were also related primarily to arsenic and PAHs in soil and sediments. All risk estimates for contact with surface water and all risk estimates for the construction workers were below 1×10^{-6}.

As discussed further in the Uncertainty Assessment, risks associated with arsenic can be considered in light of the fact that, while site-specific data were not available, OU1 soil arsenic concentrations were similar to those in background soils in suburban locations in New Jersey. Similarly, risk estimates related to use of groundwater as drinking water should be considered hypothetical, given that such use is highly unlikely.

6.2 Noncarcinogens

6.2.1 Methods

Unlike carcinogenic effects, other potential adverse health effects are not expressed as a probability. Instead, these effects are expressed as the ratio of the estimated exposure over a specified period to the RfD derived for a similar exposure period (e.g., CDI:chronic RfD). This ratio is termed a hazard quotient. If the CDI exceeds the RfD (i.e., hazard quotient greater than 1), there may be concern for noncancer adverse health effects. Exposures resulting in a hazard quotient less than or equal to 1 are very unlikely to result in noncancer adverse health effects. Because EPA states that the range of possible values around RfDs is "perhaps an order of magnitude" (Dourson 1993), the significance of intakes exceeding the RfD by one-half order of magnitude or less (i.e., hazard indices less than 5) must be considered carefully (see Section 6.3.1). However, due to the uncertainties in data supporting RfDs, their use may also underestimate risk.

In initial risk calculations, hazard quotients for individual CoPCs are summed for each exposure pathway to derive a hazard index. Hazard indices for each exposure pathway are then summed to determine the total hazard index for each population of concern.

6.2.2 Quantification of Noncarcinogenic Risks

Tables 6-3 and 6-4 summarize total hazard indices calculated for RME and typical scenarios, respectively. These tables also show the CoPCs contributing 90 percent of the total hazard index for each pathway. No current exposure scenarios had hazard indices greater than one. In the future scenarios, the long-term worker was the only receptor with hazard indices greater than the threshold of 1. The highest estimate was 3.9 for ingestion of surface soil in the developed area, based almost entirely on mercury in soil. If the single highest value of 13,800 mg/kg at SS4 were to be applied as the exposure point concentration for surface soils in the developed area, the hazard index would be 22.5.

Mercury in soil was also the primary contributor to a hazard index of 1.1 for a long-term worker's exposure to surface soil in the undeveloped area. Future hypothetical ingestion of groundwater also had a hazard index of 3.4, based on mercury, manganese, arsenic, and iron. The *cumulative* hazard indices for long-term workers in the developed and undeveloped areas were 7.3 and 4.5, respectively, related to mercury in soils and mercury and other metals in water. All other hazard indices for all other pathways and receptors were below 1.

There is no toxicity value for lead. The criterion used to identify lead as a CoPC in surface water is the national primary drinking water standard of 15 μg/L. Lead was identified as a CoPC because the maximum detected concentration of lead in surface water, 19 μg/L, exceeds this drinking water standard. While this value exceeds the drinking water standard, the estimated intake of water from these ditches (approximately 12 mL/day for up to 14 days per year) is several orders of magnitude less than intake from a drinking water source (i.e., 2 L per day, each day). Thus, intake and potential risks associated with ingestion of lead from the ditches are negligible.

Similarly, lead was present in soil at concentrations greater than the 1,000-mg/kg cleanup level identified by EPA for nonresidential sites in surface and subsurface soils in the undeveloped area. However, the exposure point concentration for lead of 1,500 mg/kg in the undeveloped area was not substantially higher than the 1,000-mg/kg threshold. For subsurface soil in the undeveloped area, the exposure point concentration of 9,200 mg/kg is about 9 times higher than the level identified by EPA (U.S. EPA 1993b). However, exposure to subsurface soils would be expected to occur for limited periods of time and infrequently, suggesting that hazards associated with lead at this location are minimal.

6.2.3 Uncertainty Assessment

Because risk characterization serves as a bridge between risk assessment and risk management, it is important that major assumptions, scientific judgments, and estimates

of uncertainties be described in the assessment. Risk assessment methods are designed to be conservative to address the uncertainties associated with each step in the risk assessment process. Thus, "true" site risks are likely to be less than risks estimated using standard risk assessment methods.

6.2.4 Summary of Key Uncertainties

Key factors in risk assessment methods that are likely to result in underestimates or overestimates of potential site risks include the following:

- Scenarios regarding future site use are estimates and may reflect higher or lower exposures than actual use patterns.
  - In particular, future use of groundwater as drinking water is highly unlikely, given the availability of other water sources
  - Trespassing is also highly unlikely, given the site location and conditions.
- Dermal exposure to chemicals in soil and sediments was evaluated for only a subset of chemicals where absorption data were adequate. Exclusion of other chemicals is likely to underestimate risks somewhat.
- Site-specific data on background concentrations of metals in soil, sediment, and water were not available. Site-related risks may have been overestimated if these metals were also present in background media at similar concentrations.
- Use of EPA's CSFs for carcinogens, which are based on the assumption that any exposure to a carcinogen is associated with some risk of cancer, is likely to overestimate risks.

- Use of studies conducted in animals dosed at high levels to derive toxicity values may overestimate risks in human populations exposed at much lower levels.

EPA has stated in its guidelines for cancer risk assessment, "...the linearized multistage procedure leads to a plausible upper limit to the risk that is consistent with proposed mechanisms of carcinogenesis...The true value of the risk is unknown, and may be as low as zero" (51 Fed. Reg. 185:33992, 33998 [1986]). As a result, actual site risks related to exposures to carcinogens in site media are unlikely to be underestimated, and are likely to be substantially overestimated by the procedures applied in this risk assessment. However, given uncertainties regarding individual exposure patterns and sensitivities, actual risk for an individual may be higher or lower than the calculated estimate.

For evaluating noncarcinogenic risks, EPA states in IRIS that the range of possible values around RfDs is "perhaps an order of magnitude" (U.S. EPA 2001a). EPA staff (Dourson 1993) have expanded on this concept by noting that the range varies for different RfDs, depending on the uncertainty factors used (the greater the uncertainty factor, the greater the possible range). This means, in general, that environmental exposures falling into the range of the RfD cannot be distinguished scientifically from the RfD itself. That is, if a CoPC has an RfD of 1 mg/kg-day, the range of true no-effect values might be 0.3–3 mg/kg-day, indicating a combined span of about one-half an order of magnitude above and below the RfD (Dourson 1993). EPA staff have further noted (Woodruff 1989, pers. comm.) that, although they are generally concerned if intakes exceed the RfD by one-half order of magnitude, the magnitude of the uncertainty factors in the RfD must be considered in evaluating the significance of any exceedance of the RfD. For example, fluoride has an uncertainty factor of 1; thus, a regulator might be concerned about any exceedance of the RfD. On the other hand, for CoPCs with very large uncertainty factors (e.g., 1,000), exceedances of 5-fold or more may not be of concern.

This statement is particularly relevant for risk estimates related to inorganic mercury here, which are based on an RfD derived by EPA through application of an uncertainty factor of 1000. As noted previously, the RfD for mercury applied here in hazard estimates for soil was derived from a data set that was limited. Specifically, EPA noted that there were no chronic oral studies available to derive an RfD and, as a result, EPA applied a 1000-fold uncertainty factor. This effectively means that adverse effects were seen in animals at a dose level 1000 times higher than the RfD, which is assumed to be the safe concentration. The hazard quotient of 3.8 for mercury in soil should be considered in light of the large margin between the dose potentially causing adverse effects and the RfD.

Regarding the cancer risk estimate for arsenic in soil, the contribution from naturally occurring background sources of arsenic in soil should be considered in evaluating the risk estimates. Although site-specific background data are not available, background data for the state of New Jersey suggest that the arsenic concentrations in OU1 soils may not differ from those that would be found associated with soils that have no known source of arsenic (i.e., background locations).

Comparison of OU1 soil arsenic concentrations with New Jersey suburban background

Area	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	90th percentile Concentration (mg/kg)
Developed area (paved and unpaved)	0.85 ND	11	8.4
Developed area (unpaved only)	0.85 ND	11	9.4
Undeveloped area	1.4 ND	26	12
New Jersey suburban background	0.02	22.70	10.7

Source: NJDEP (1993)

As is indicated in the table above, the OU1 soil arsenic concentrations are either within or similar to the range of concentrations identified as background within New Jersey soils. Therefore, risks related to exposure to arsenic in OU1 soil may be similar to those for locations with naturally occurring arsenic in soils.

7 Conclusions

On behalf of Morton International and Velsicol, Exponent prepared a draft HHRA for OU1 of the Ventron/Velsicol site located in Wood-Ridge and Carlstadt, New Jersey. The objective of the baseline HHRA was to quantify human health risks associated with CoPCs within OU1 in the absence of any action to control or mitigate those CoPCs (i.e., under the no-action alternative). The HHRA focused on current and hypothetical future conditions that assumed use of both the undeveloped and the developed areas as work places in the future. Potential risk estimates for carcinogens were compared to the range of excess target risk levels (1×10^{-6} to 1×10^{-4}) identified by EPA in the NCP, and potential risk estimates for noncarcinogens were compared with a hazard index of 1. Exposure assumptions and toxicity values used in this HHRA reflect the inherently conservative nature of risk assessments conducted for regulatory purposes.

The following exposure pathways were evaluated:

- Current long-term worker in the developed area (including ingestion of and dermal contact with surface soil, and inhalation of outdoor air)
- Current trespasser to the undeveloped area (including ingestion of and dermal contact with surface soil, sediments, and surface water)
- Future long-term worker in the developed and undeveloped areas (including ingestion of and dermal contact with surface soil, inhalation of outdoor air, and ingestion of and dermal contact with groundwater)
- Future construction worker in the developed and undeveloped areas (including ingestion of and dermal contact with surface soil, ingestion of and dermal contact with subsurface soils, and ingestion of and dermal contact with groundwater).

These scenarios are hypothetical. Use of OU1 water as drinking water is highly unlikely, given the availability of other drinking water sources. Development of the undeveloped area for workplace use would require fill in many areas, so direct exposure to soil would not be likely to occur. Trespassers entering the site is considered unlikely, given the site location and access restrictions, the current conditions, and anticipated future site use. In addition to consideration of hypothetical exposure pathways, conservative assumptions regarding exposure and toxicity were used to calculate potential risk estimates.

For carcinogens, all estimated total cancer risks for both RME and typical scenarios were within the 10^{-6} to 10^{-4} target risk range. Specific results for each scenario were as follows:

For the developed area:

- Under current conditions in the developed area, the long-term worker scenario had a *cumulative* risk estimate of 4×10^{-5}, due primarily to arsenic in water, and arsenic and PAHs in soil.
- Under hypothetical future conditions in the developed area, the long-term worker scenario had the same *cumulative* risk estimate as did the long-term worker under current conditions (i.e., 4×10^{-5}), due primarily to arsenic in water, and arsenic and PAHs in soil.

For the undeveloped area:

- Under hypothetical future conditions in the undeveloped area, the RME risk estimate for a long-term worker's ingestion of surface soil was 9×10^{-6}, and dermal contact with soil was 1×10^{-5}, both related primarily to arsenic and PAHs.
- The highest *cumulative* risk estimate for a receptor was the combined estimate of 5×10^{-5} for a hypothetical future long-term worker in the undeveloped area, related to groundwater and soil contact with arsenic

and PAHs. This risk estimate is less than the upper limit of the acceptable risk levels identified by EPA.

- The highest *pathway* risk estimate for a receptor was 3×10^{-5} for the hypothetical future use of groundwater as workplace drinking water, due primarily to arsenic in groundwater (i.e., the arsenic risk estimate was 2.7×10^{-5}).

- Current trespassers to the undeveloped area had *cumulative* risk estimates of 2×10^{-6}, for contact with soils. The total cumulative estimate for trespassers to the West Ditch or the onsite basin was 1×10^{-6}. Risks for this scenario were also related primarily to arsenic and PAHs in soil and sediments.

- All risk estimates for current and future contact with surface water in the undeveloped area were well within acceptable levels.

Developed and undeveloped area:

- All risk estimates for the construction workers were below 1×10^{-6}, indicating that potential risks related to human contact with subsurface soils are well within acceptable levels identified by EPA.

For noncarcinogens, no current exposure scenarios had hazard indices greater than 1. In the future scenarios, the long-term worker was the only receptor with hazard indices greater than the threshold of 1. Results for the future scenarios for the long-term worker were as follows:

- The highest estimated hazard index was 3.9 for ingestion of surface soil in the developed area, based almost entirely on mercury in soil. If the single highest value of 13,800 mg/kg at SS-04 were to be applied as the exposure point concentration for surface soils in the developed area, the hazard index would be 22.5.

- Mercury in soil was also the primary contributor to a hazard index of 1.1 for long-term worker's exposure to surface soil in the undeveloped area.
- Future hypothetical ingestion of groundwater site wide had a hazard index of 3.4 based on mercury, manganese, arsenic, and iron.
- The *cumulative* hazard index for long-term workers in the developed and undeveloped areas were 7.3 and 4.5, respectively, related to mercury in soils and mercury and other metals in water.

Although the risk and hazard estimates for several hypothetical pathways exceeded the lower end of the acceptable target range identified by EPA, these findings should be considered within the context of the uncertainties related to the estimation methods. Mercury and arsenic were responsible for the majority of site risks. The potential for overestimation of OU1 risks related to exposure assumptions and to the toxicity value for mercury derived through application of a 1000-fold uncertainty factor, suggests that risks may be lower than the RME estimates provided here. Furthermore, EPA indicates that the range of possible values around RfDs such as that used to evaluate inorganic mercury is "perhaps an order of magnitude." Thus, the hazard quotients estimated here for mercury in soil should be considered in this light.

In addition, although site-specific background concentrations were not available, concentrations of arsenic in OU1 soil were similar to those identified in background locations in suburban New Jersey. Thus, risks related to arsenic in OU1 soil would not be expected to differ substantially from estimates derived for typical background locations. Moreover, many of the potential exposure pathways considered here are entirely hypothetical. In particular, use of groundwater as drinking water is highly unlikely and is considered here only for risk assessment purposes.

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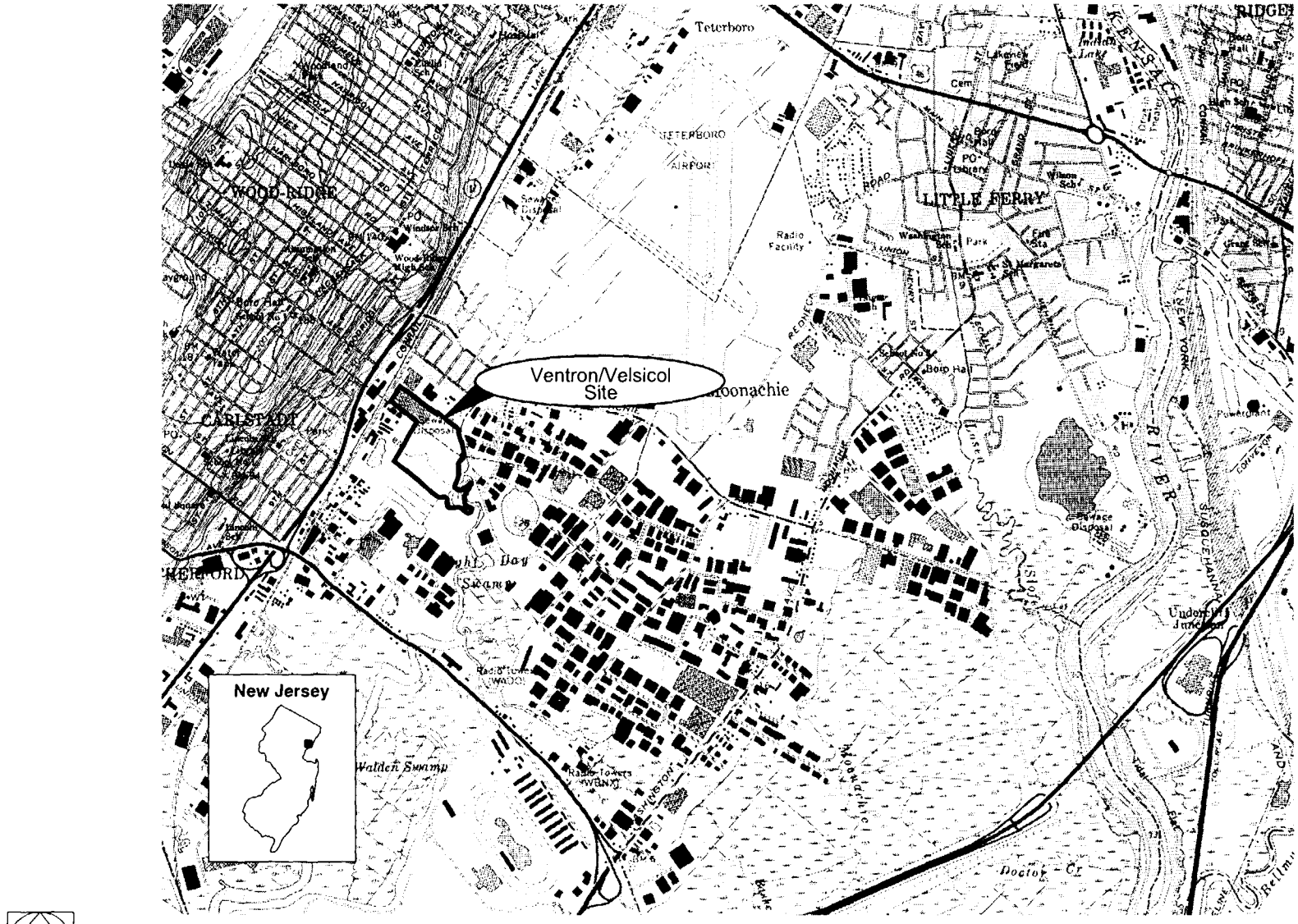
Figures



Base map source: USGS Weehawken, NJ-NY quadrangle

Figure 1-1. Site location map.

8600B3N.001 0401 11/16/98 WA

Photograph source: James Stewart, Inc. (November 29, 1997)

LEGEND

1. Diamond Shamrock/Henkel ditch (north)
2. Nevertouch Creek
3. Diamond Shamrock/Henkel ditch (south)
4. Tide gate
5. Berry's Creek
6. Railroad bridge
7. Former POTW
8. Ethel Boulevard
9. Wolf warehouse
10. U.S. Life warehouse
11. Randolph Products
12. Diamond Shamrock/Henkel Property
13. Park Place East
14. West ditch

Site boundary shown as white line

OU1 Operable Unit 1

OU2 Operable Unit 2

0 200 feet
approximate scale

Figure 1-2. Site layout map.

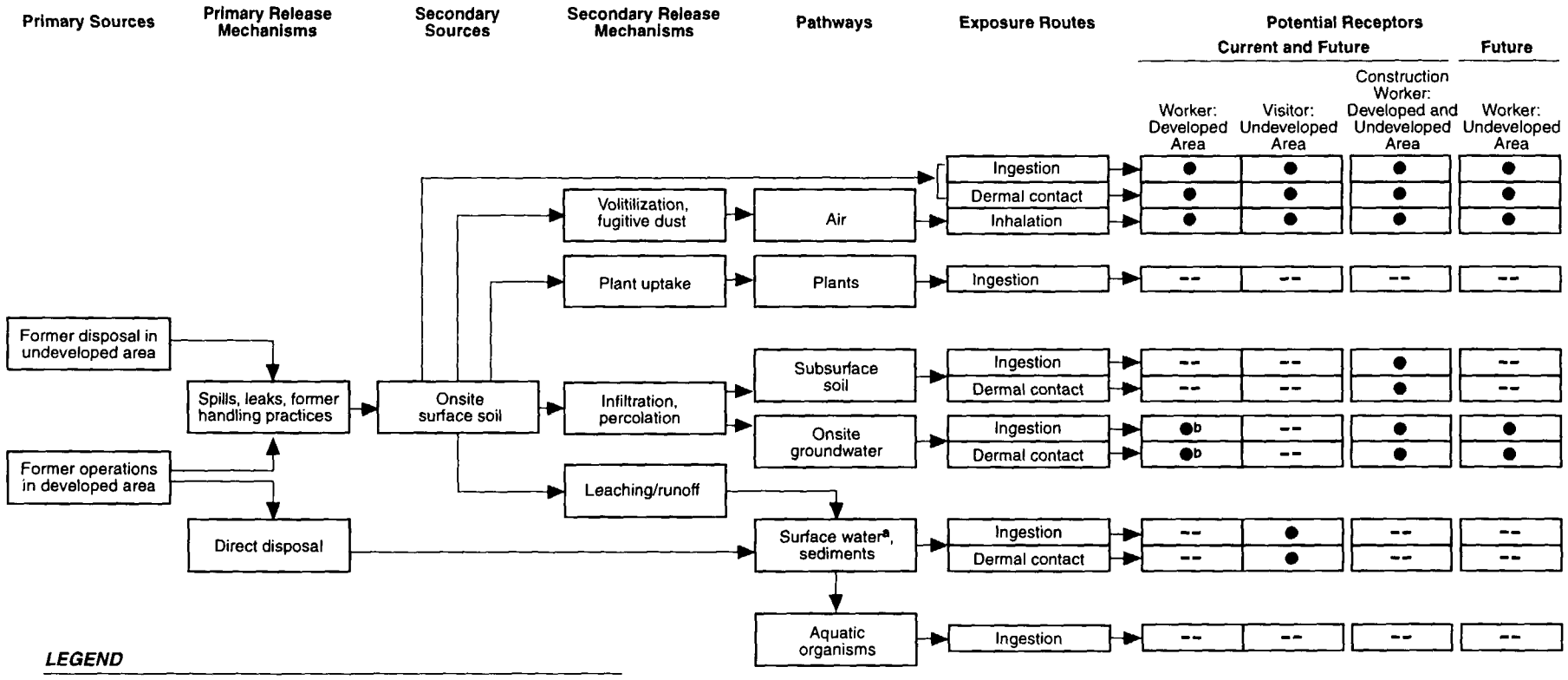
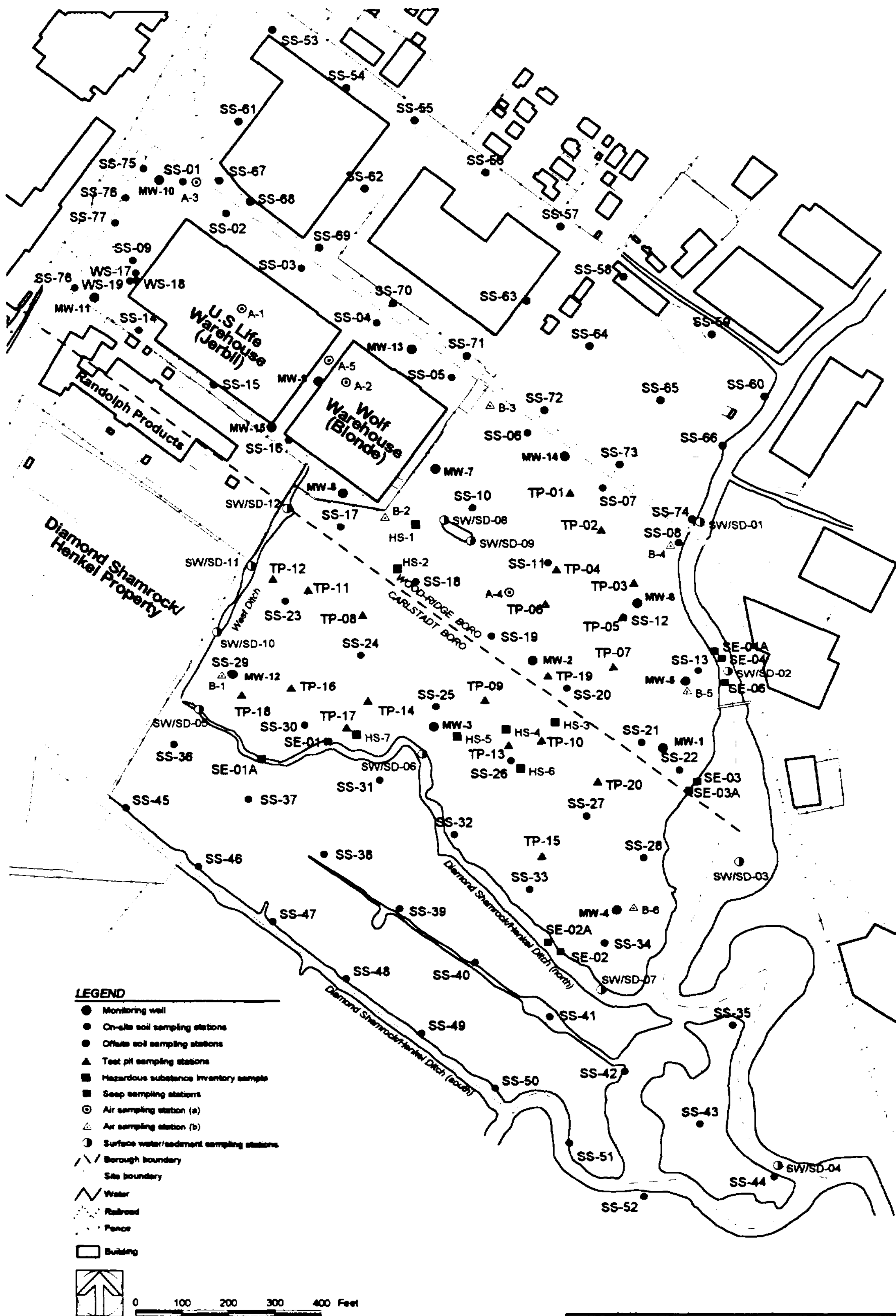


Figure 2-1. Human health conceptual site model



NOTE The warehouse evaluation samples and interior soil samples appear on Figure 2-2 in the RI.

Source map survey by James Stewart, Inc.

Figure 3-1. Remedial investigation sample locations.

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Tables

Table 3-1. Contaminants of potential concern by medium in OU1 of the Ventron/Velsicol site

Analyte	Developed Area Soils (0–12 in.)	Undeveloped Area Soils (0–12 in.)	Developed and Undeveloped Area Subsurface Soils	Surface Water	Ground-water	Outdoor Air
Inorganics						
Aluminum	X	X	X			
Antimony		X	X			
Arsenic	X	X	X		X	
Barium		X	X		X	
Cadmium		X	X		X	
Chromium	X	X	X			
Copper	X	X	X		X	
Iron	X	X	X	X	X	
Lead	X	X	X	X		
Manganese	X	X	X	X	X	
Mercury (total)	X	X	X	X	X	
Mercury Vapor						X
Nickel		X	X		X	
Silver		X	X			
Thallium	X	X	X		X	
Vanadium	X	X	X		X	
Zinc		X	X			
PCBs						
Aroclor® 1242			X			
Aroclor® 1248		X	X			
Aroclor® 1254			X			
Aroclor® 1260		X	X			
Semivolatiles						
1,4-Dichlorobenzene					X	
2-Methylnaphthalene			X		X	
4-Methylphenol					X	
Benz[a]anthracene	X	X	X			
Benzo[a]pyrene	X	X	X			
Benzo[b]fluoranthene	X	X	X			
Benzo[ghi]perylene			X			
Benzo[k]fluoranthene			X			
bis[2-Ethylhexyl]phthalate		X			X	
Carbazole			X			
Dibenz[a,h]anthracene	X	X	X			
Indeno[1,2,3-cd]pyrene		X	X			
Naphthalene			X		X	
Phenanthrene		X	X			
Volatiles						
1,2-Dichloroethene, isomers					X	
4-Methyl-2-pentanone					X	
Acetone					X	
Benzene	X		X		X	
Chlorobenzene					X	
Chloroethane					X	
Toluene			X		X	
Xylene isomers (total)					X	

Note: OU - operable unit

Table 4-1. Selection of exposure pathways for Ventron/Velsicol site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/ Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Soil, sediment, water, air	Soil, sediment, water, air	Soil, sediment, water, air	Resident	Adult/ child	Ingestion, dermal, inhalation	Onsite	Not analyzed	Residential populations not evaluated here due to lack of current residential use and unlikely future development for residential use
Current/Future	Air	Air	Outdoor air in developed and undeveloped areas	Long-term worker	Adult	Inhalation	Onsite	Deterministic	Contact with CoPCs in air by workers identified as a potential pathway and evaluated in risk assessment
Current	Soil	Surface soil	Surface soil in developed area (unpaved soil only)	Long-term worker	Adult	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in surface soil by workers identified as a potential pathway and evaluated in risk assessment
Future	Soil	Surface soil	Surface soil in developed area (all)	Long-term worker	Adult	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in surface soil by workers identified as a potential pathway and evaluated in risk assessment
Current/Future	Soil	Surface soil	Surface soil in undeveloped area	Trespasser	Adult/older child	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in surface soil by trespassers identified as a potential pathway and evaluated in risk assessment
Future	Soil	Surface soil	Surface soil in undeveloped area	Long-term worker	Adult	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in surface soil by workers identified as a potential pathway and evaluated in risk assessment
Current/Future	Soil	Subsurface soil	Subsurface soil (1-20 ft depths) in developed and undeveloped areas	Construction worker	Adult	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in subsurface soil by construction workers identified as a potential pathway and evaluated in risk assessment
Current/Future	Sediment	Sediment	Surface sediment in undeveloped area[a]	Trespasser	Adult/older child	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in sediments by trespassers identified as a potential pathway and evaluated in risk assessment
Current/Future	Water	Surface water	Surface water in undeveloped area[a]	Trespasser	Adult/older child	Ingestion, dermal	Onsite	Deterministic	Contact with CoPCs in OU1 surface water by trespassers identified as a potential pathway and evaluated in risk assessment
Future	Water	Groundwater	Groundwater sitewide	Long-term worker	Adult	Ingestion, dermal	Onsite	Deterministic	Use of groundwater as workplace drinking water identified as a potential pathway and evaluated in risk assessment

Note: OU1 - Operable Unit 1
CoPC - contaminants of potential concern

[a] Surface water and sediments addressed are from West Ditch and the onsite basin.

Table 4-2. Values used for daily intake calculations for surface soils/sediments: OU1 Ventron/Velsicol site adult trespasser scenario

Scenario Timeframe: Current/Future
Medium: Soil/sediment
Exposure Medium: Surface soil/sediment
Exposure Point: Undeveloped Area surface soil/sediment
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration in sediment/soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x IR x FI x EF x ED / (BW x AT)
	IR	Ingestion rate	mg soil/day	100	U.S. EPA 1991	50	U.S. EPA 1991	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	30	U.S. EPA 1991	9	U.S. EPA 1991	
	BW	Body weight	kg	70	U.S. EPA 1997a	70	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	10,950	U.S. EPA 1989	3,285	U.S. EPA 1989	
Dermal	CS	Chemical concentration in sediment/soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x SA x AF x EF x ED x ABS
	SA	Skin surface area available for contact	cm^2/event	5,800	U.S. EPA 1997a	5,000	U.S. EPA 1997a	/ (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.07	U.S. EPA 1999a	0.07	U.S. EPA 1999a	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	30	U.S. EPA 1991	9	U.S. EPA 1991	
	BW	Body weight	kg	70	U.S. EPA 1997a	70	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	10,950	U.S. EPA 1989	3,285	U.S. EPA 1989	
	ABS	Dermal absorption factor - arsenic	unitless	0.03	U.S. EPA 1999a	0.03	U.S. EPA 1999a	
	ABS	Dermal absorption factor - cadmium	unitless	0.001	U.S. EPA 1999a	0.001	U.S. EPA 1999a	
	ABS	Dermal absorption factor - organics	unitless	0.10	U.S. EPA 1999a	0.10	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PAHs	unitless	0.13	U.S. EPA 1999a	0.13	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PCBs	unitless	0.14	U.S. EPA 1999a	0.14	U.S. EPA 1999a	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
PCB - polychlorinated biphenyl
PAH - polycyclic aromatic hydrocarbons
RME - reasonable maximum exposure
[a] Based on best professional judgment.

Table 4-3. Values used for daily intake calculations for surface soils/sediments: OU1 Ventron/Velsicol site older child trespasser scenario

Scenario Timeframe: Current/Future
Medium: Soil/sediment
Exposure Medium: Surface soil/sediment
Exposure Point: Undeveloped Area surface soil/sediment
Receptor Population: Trespasser
Receptor Age: Older Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration in sediment/soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x IR x FI x EF x ED / (BW x AT)
	IR	Ingestion rate	mg soil/day	100	U.S. EPA 1991	50	U.S. EPA 1991	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	9	[a]	9	[a]	
	BW	Body weight	kg	49	U.S. EPA 1997a	49	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	2,190	U.S. EPA 1989	2,190	U.S. EPA 1989	
Dermal	CS	Chemical concentration in sediment/soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x SA x AF x EF x ED x ABS
	SA	Skin surface area available for contact	cm^2/event	4,400	U.S. EPA 1997a	3,600	U.S. EPA 1997a	/ (BW x AT)
	AF	Sediment/soil-to-skin adherence factor	mg/cm^2	0.2	U.S. EPA 1999a	0.2	U.S. EPA 1999a	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	9	[a]	9	[a]	
	BW	Body weight	kg	49	U.S. EPA 1997a	49	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	2,190	U.S. EPA 1989	2,190	U.S. EPA 1989	
	ABS	Dermal absorption factor - arsenic	unitless	0.03	U.S. EPA 1999a	0.03	U.S. EPA 1999a	
	ABS	Dermal absorption factor - cadmium	unitless	0.001	U.S. EPA 1999a	0.001	U.S. EPA 1999a	
	ABS	Dermal absorption factor - organics	unitless	0.10	U.S. EPA 1999a	0.10	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PAHs	unitless	0.13	U.S. EPA 1999a	0.13	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PCBs	unitless	0.14	U.S. EPA 1999a	0.14	U.S. EPA 1999a	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
PCB - polychlorinated biphenyl
PAH - polycyclic aromatic hydrocarbons
RME - reasonable maximum exposure

[a] Based on best professional judgment.

Table 4-4. Values used for daily intake calculations for surface soils: OU1 Ventron/Velsicol site long-term worker scenario

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed/Undeveloped Area surface soil
Receptor Population: Long-Term Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration in soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x IR x FI x EF x ED / (BW x AT)
	IR	Ingestion rate	mg soil/day	50	U.S. EPA 1991	50	U.S. EPA 1991	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	250	U.S. EPA 1997a	250	U.S. EPA 1997a	
	ED	Exposure duration	years	25	U.S. EPA 1991	6.6	U.S. EPA 1997a	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	
Dermal	CS	Chemical concentration in soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x SA x AF x EF x ED x ABS
	SA	Skin surface area available for contact	cm^2/event	3,300	U.S. EPA 1997a	3,300	U.S. EPA 1997a	/ (BW x AT)
	AF	Soil-to-skin adherence factor	mg/cm^2	0.2	U.S. EPA 1997a, 1999a	0.2	U.S. EPA 1997a, 1999a	
	EF	Exposure frequency	days/year	250	U.S. EPA 1997a	250	U.S. EPA 1997a	
	ED	Exposure duration	years	25	U.S. EPA 1991	6.6	U.S. EPA 1997a	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	
	ABS	Dermal absorption factor - arsenic	unitless	0.03	U.S. EPA 1999a	0.03	U.S. EPA 1999a	
	ABS	Dermal absorption factor - cadmium	unitless	0.001	U.S. EPA 1999a	0.001	U.S. EPA 1999a	
	ABS	Dermal absorption factor - organics	unitless	0.10	U.S. EPA 1999a	0.10	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PAHs	unitless	0.13	U.S. EPA 1999a	0.13	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PCBs	unitless	0.14	U.S. EPA 1999a	0.14	U.S. EPA 1999a	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
PCB - polychlorinated biphenyl
PAH - polycyclic aromatic hydrocarbons
RME - reasonable maximum exposure

[a] Based on best professional judgment.

Table 4-5. Values used for daily intake calculations for surface soils: OU1 Ventron/Velsicol site construction worker scenario

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Subsurface soil (1-20 ft depths in developed and undeveloped areas)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration - subsurface soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x IR x FI x EF x ED / (BW x AT)
	IR	Ingestion rate	mg soil/day	100	U.S. EPA 1991	50	U.S. EPA 1991	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	10	[a]	25	[a]	
	ED	Exposure duration	years	2	[a]	2	[a]	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	250	U.S. EPA 1989	500	U.S. EPA 1989	
Dermal	CS	Chemical concentration in soil	mg/kg	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	kg/mg	0.000001	--	0.000001	--	CS x CF x SA x AF x EF x ED x ABS
	SA	Skin surface area available for contact	cm^2/event	3,300	U.S. EPA 1997a	3,300	U.S. EPA 1997a	/ (BW x AT)
	AF	Soil-to-skin adherence factor	mg/cm^2	0.8	U.S. EPA 1997a, 1999a	0.2	U.S. EPA 1997a, 1999a	
	EF	Exposure frequency	days/year	10	[a]	25	[a]	
	ED	Exposure duration	years	2	[a]	2	[a]	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	
	ABS	Dermal absorption factor - arsenic	unitless	0.03	U.S. EPA 1999a	0.03	U.S. EPA 1999a	
	ABS	Dermal absorption factor - cadmium	unitless	0.001	U.S. EPA 1999a	0.001	U.S. EPA 1999a	
	ABS	Dermal absorption factor - organics	unitless	0.10	U.S. EPA 1999a	0.10	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PAHs	unitless	0.13	U.S. EPA 1999a	0.13	U.S. EPA 1999a	
	ABS	Dermal absorption factor - PCBs	unitless	0.14	U.S. EPA 1999a	0.14	U.S. EPA 1999a	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
PCB - polychlorinated biphenyl
PAH - polycyclic aromatic hydrocarbons
RME - reasonable maximum exposure

[a] Based on best professional judgment.

Table 4-6. Summary of absorption factors used to assess dermal exposures via soil/sediment and surface water

Contaminant of Concern	Dermal Absorption Factors[a] (unitless)	Oral to Dermal Adjustment Factor (unitless)	Dermal Permeability Constants[a] (cm/hour)
Inorganic Compounds			
Aluminum	--	0.01	0.001
Antimony	--	0.15	0.001
Arsenic	0.03	0.95	0.001
Barium	--	0.07	0.001
Cadmium	0.001	0.025	0.001
Chromium (as Chromium VI)	--	0.1	0.002
Copper	--	0.01	0.001
Iron	--	0.01	0.001
Lead	NA	NA	NA
Manganese	--	0.04	0.001
Mercury	--	0.07	0.001
Mercury Vapor	NA	NA	NA
Nickel	--	0.04	0.0002
Silver	--	0.01	0.0006
Thallium (as thallium chloride)	--	1	0.001
Vanadium	--	0.026	0.001
Zinc	--	0.01	0.0006
Organic Compounds			
Acetone	--	1	0.0014
Benzene	--	1	0.015
bis[2-ethylhexyl]phthalate	0.1	1	0.025
Carbazole	0.1	1	0.0069
Chloroethane	--	0.9	0.0047
Chlorobenzene	--	1	0.029
1,4-Dichlorobenzene	0.1	1	0.043
1,2-Dichloroethene, isomers	--	1	0.0079
4-Methyl-2-pentanone	--	1	0.000036
4-Methylphenol	0.1	1	0.04
Toluene	--	1	0.012
Xylene isomers (total)	--	1	0.054
Polycyclic Aromatic Hydrocarbons			
Benz[a]anthracene	0.13	1	--
Benzo[a]pyrene	0.13	1	--
Benzo[b]fluoranthene	0.13	1	--
Benzo[k]fluoranthene	0.13	1	--
Dibenz[a,h]anthracene	0.13	1	--
Indeno[1,2,3-cd]pyrene	0.13	1	--
2-Methylnaphthalene	0.13	1	0.048
Napthalene	0.13	1	0.048
Polychlorinated Biphenyls	0.14	1	--
Aroclor® 1254	0.14	1	--

Note: -- - no data available for these chemicals
NA - not applicable

[a] Dermal absorption factors, oral-to-dermal adjustment factors, and permeability constants from U.S. EPA (1999a) unless otherwise noted. Consistent with guidance from U.S. EPA 1999a, where data for absorption from soil are not available, dermal exposure is evaluated qualitatively.

Table 4-7. Values used for daily intake calculations for undeveloped area surface water in ditches: OU1 Ventron/Velsicol site adult trespasser scenario

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical concentration in surface water	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/m^3	0.001	--	0.001	--	CW x CF x IR x EF x ED x ET / (BW x AT)
	IR	Ingestion rate	mL/hour	12	U.S. EPA 1991[a]	12	U.S. EPA 1991[a]	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	30	U.S. EPA 1997a	9	U.S. EPA 1997a	
	ET	Exposure time	hours/event	1	U.S. EPA 1997a	0.5	U.S. EPA 1997a	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	10,950	U.S. EPA 1989	3,285	U.S. EPA 1989	
Dermal	CW	Chemical concentration in surface water	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/m^3	0.001	--	0.001	--	CW x CF x SA x PC x EF x ED x ET
	SA	Skin surface area available for contact	cm^2 /event	5,600	U.S. EPA 1997a	5,000	U.S. EPA 1997a	/ (BW x AT)
	PC	Chem.-spec. dermal permeability constant	cm/hour	chem. spec.	U.S. EPA 1999a	chem. spec.	U.S. EPA 1999a	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	30	U.S. EPA 1997a	9	U.S. EPA 1997a	
	ET	Exposure time	hrs/day	1	[a]	0.5	[a]	
	BW	Body weight	kg	70	U.S. EPA 1997a	70	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	10,950	U.S. EPA 1989	3,285	U.S. EPA 1989	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
RME - reasonable maximum exposure

[a] Based on best professional judgment.

Table 4-8. Values used for daily intake calculations for undeveloped area surface water in ditches: OU1 Ventron/Velsicol site older child trespasser scenario

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Older Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical concentration in surface water	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/m^3	0.001	--	0.001	--	CW x CF x IR x EF x ED x ET / (BW x AT)
	IR	Ingestion rate	mL/hour	12	U.S. EPA 1991[a]	12	U.S. EPA 1991[a]	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	9	[a]	9	[a]	
	ET	Exposure time	hours/event	1	[a]	0.5	[a]	
	BW	Body weight	kg	49	U.S. EPA 1997a	49	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	2,190	U.S. EPA 1989	2,190	U.S. EPA 1989	
Dermal	CW	Chemical concentration in surface water	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/m^3	0.001	--	0.001	--	CW x CF x SA x PC x EF x ED x ET
	SA	Skin surface area available for contact	cm^2 /event	4,400	U.S. EPA 1997a	3,600	U.S. EPA 1997a	/ (BW x AT)
	PC	Chem.-spec. dermal permeability constant	cm/hour	chem. spec.	U.S. EPA 1999a	chem. spec.	U.S. EPA 1999a	
	EF	Exposure frequency	days/year	14	[a]	5	[a]	
	ED	Exposure duration	years	9	[a]	9	[a]	
	ET	Exposure time	hours/day	1	[a]	0.5	[a]	
	BW	Body weight	kg	49	U.S. EPA 1997a	49	U.S. EPA 1997a	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	3,285	U.S. EPA 1989	3,285	U.S. EPA 1989	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
PCB - polychlorinated biphenyl
RME - reasonable maximum exposure

[a] Based on best professional judgment.

[b] Refer to supporting information in text.

Table 4-9. Values used for daily intake calculations for groundwater: OU1 Ventron/Velsicol site long-term worker scenario

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater
Exposure Point: Groundwater sitewide
Receptor Population: Long-Term Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration in water	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/ml	0.001	--	0.001	--	CW x CF x IR x EF x ED / (BW x AT)
	IR	Ingestion rate	L/day	1	U.S. EPA 1997a	0.7	U.S. EPA 1997a	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	250	U.S. EPA 1991	250	U.S. EPA 1991	
	ED	Exposure duration	years	25	U.S. EPA 1991	6.6	U.S. EPA 1997a	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	
Dermal	CS	Chemical concentration in soil	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/ml	0.001	--	0.001	--	CW x CF x SA x PC x EF x ED x ET
	SA	Skin surface area available for contact	cm^2/event	977	U.S. EPA 1997a	793	U.S. EPA 1997a	/ (BW x AT)
	PC	Chem.-spec. dermal permeability constant	cm/hour	chem. spec.	USEPA 1999a	chem. spec.	USEPA 1999a	
	EF	Exposure frequency	days/year	250	U.S. EPA 1991	250	U.S. EPA 1991	
	ED	Exposure duration	years	25	U.S. EPA 1991	6.6	U.S. EPA 1997a	
	ET	Exposure time	hours/day	0.03	[a]	0.03	[a]	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
RME - reasonable maximum exposure

[a] Based on best professional judgment. Dermal surface areas represent values for hands only and were derived from the average of values for men and women. RME values are maximum, and typical values are means, from U.S. EPA (1997, Table 6-4). Exposure time relates to time washing hands. CT value is mean of 1.4 L from U.S. EPA (1997) assuming half is consumed at work.

Table 4-10. Values used for daily intake calculations for outdoor air: OU1 Ventron/Velsicol site long-term worker scenario

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Outdoor air
Receptor Population: Long-Term Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical concentration in air	mg/L	see Appendix A	--	see Appendix A	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Conversion factor	L/ml	0.001	--	0.000001	--	CW x CF x IR x EF x ED x ET / (BW x AT)
	IR	Inhalation rate	L/day	3.3	U.S. EPA 1997a	1.3	U.S. EPA 1997a	
	FI	Fraction ingested	--	1	[a]	1	[a]	
	EF	Exposure frequency	days/year	250	[a]	250	[a]	
	ED	Exposure duration	years	25	U.S. EPA 1991	6.6	U.S. EPA 1997a	
	ET	Exposure time	hours/day	2	[a]	2	[a]	
	BW	Body weight	kg	70	U.S. EPA 1991	70	U.S. EPA 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	U.S. EPA 1989	25,550	U.S. EPA 1989	
	AT-NC	Averaging Time (Noncancer)	days	6,250	U.S. EPA 1989	1,650	U.S. EPA 1989	

Note: -- - not applicable
CT - central tendancy
OU1 - Operable Unit 1
RME - reasonable maximum exposure

[a] Based on best professional judgment.

Table 5-1. Oral toxicity values for estimating excess cancer risks associated with contaminants of concern

Contaminant of Concern	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	EPA Weight-of-Evidence Classification[a]	Oral-to-Dermal Adjustment Factor[b]	Adjusted Dermal CSF[b] (mg/kg-day)	Type of Cancer	Basis of Cancer Slope Factor	Source of CSF	Date of CSF Source[c] (MM/DD/YY)
Inorganic Chemicals								
Arsenic	1.5	A	0.95	1.5	Skin	Human population, drinking water	IRIS	12/29/00
Organic Chemicals								
Benzene	0.055	A	1	0.055	Leukemia	Occupational	IRIS[d]	04/20/01
bis[2-ethylhexyl]phthalate	0.014	B2	1	0.014	Liver	Rat and mouse diet	IRIS	03/08/01
Carbazole	0.02	B2	1	0.02	Liver tumors	Mouse diet	HEAST	07/31/97
Chloroethane	0.0029	B2	0.9	0.0029	Uterine cancer	Mouse inhalation	NCEA[d]	07/12/99
1,4-Dichlorobenzene	0.024	C	1	0.024	Liver tumors	Mouse gavage	HEAST	07/31/97
PAH Compounds[e]								
Benz[a]anthracene	0.73	B2	1	0.73	Based on potency relative to benzo[a]pyrene	Mouse diet	IRIS	02/13/01
Benzo[a]pyrene	7.3	B2	1	7.3	Forestomach, squamous cell papillomas and carcinomas	Mouse diet	IRIS	02/13/01
Benzo[b]fluoranthene	0.73	B2	1	0.73	Based on potency relative to benzo[a]pyrene	Mouse diet	IRIS	02/13/01
Benzo[k]fluoranthene	0.073	B2	1	0.73	Based on potency relative to benzo[a]pyrene	Mouse diet	IRIS	02/13/01
Dibenz[a,h]anthracene	7.3	B2	1	7.3	Based on potency relative to benzo[a]pyrene	Mouse diet	IRIS	02/13/01
Indeno[1,2,3-cd]pyrene	0.73	B2	1	0.73	Based on potency relative to benzo[a]pyrene	Mouse diet	IRIS	02/13/01
Polychlorinated Biphenyls	2	B2	1	2	Liver hepatocellular adenomas, carcinomas, cholangiomas, or cholangiocarcinomas	Rat diet	IRIS	12/29/00

Note: Toxicity values obtained from U.S. EPA (2000a), unless otherwise specified.
CSF - carcinogenic slope factor
EPA - U.S. Environmental Protection Agency
PAH - polycyclic aromatic hydrocarbon

[a] A - human carcinogen.
B2 - probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - possible human carcinogen.

[b] Consistent with U.S. EPA (1999a), where oral absorption is less than 50 percent, oral reference doses are adjusted by multiplying by the oral-to-dermal adjustment factor. See Table 4-5 for references for dermal adjustment factor.

[c] Date represents: IRIS - date is when IRIS was searched; HEAST - Publication date; NCEA - article date.

[d] Carcinogenic slope factor as cited by U.S. EPA Region IX (U.S. EPA 2001).

[e] Carcinogenic slope factors for PAH compounds are based on potency relative to benzo[a]pyrene per EPA guidance (U.S. EPA 1998).

Table 5-2. Noncancer toxicity data—oral/dermal reference doses

Chemical of Concern	Oral Chronic RfD (mg/kg-day)	Oral-to-Dermal Adjustment Factor[a]	Adjusted Dermal RfD[b] (mg/kg-day)	Primary Target Organ or System	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[c], (MM/DD/YY)
Inorganics							
Aluminum	1	0.01	0.01	--	--	NCEA[d]	NA
Antimony	0.0004	0.15	0.00006	Longevity; metabolic	1000/1	IRIS	2/15/01
Arsenic	0.0003	0.95	0.0003	Skin	3/1	IRIS	12/29/00
Barium	0.07	0.07	0.0049	None reported (kidney)	3/1	IRIS	2/15/01
Cadmium	0.0005[e]	0.025	0.0000125	Kidney	10/1	IRIS	12/29/00
Chromium (as Chromium VI)	0.003[f]	0.1	0.0003	None reported	300/3	IRIS	12/29/00
Copper	0.037	0.01	0.00037	--	--	HEAST[d]	NA
Iron	0.3	0.01	0.003	--	--	NCEA[d]	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Manganese	0.047	0.04	0.00141	Central nervous system	1/3	IRIS	12/29/00
Mercury	0.0003	0.07	0.000021	Immunologic	1,000/1	IRIS	12/29/00
Mercury vapor	0.0003 mg/m^3 [g]	NA	NA	Central nervous system	30/1	IRIS	3/8/01
Nickel	0.02	0.04	0.0008	Decreased body and organ weights	300/1	IRIS	2/5/01
Silver	0.005	0.01	0.00005	Skin (argyria)	3/1	IRIS	3/8/01
Thallium (as thallium chloride)	0.00008	1	0.00008	Liver	3000/1	IRIS	12/29/00
Vanadium (as vanadium pentoxide)	0.009	0.026	0.000234	Hematopoetic	100/1	IRIS	3/8/01
Zinc	0.3	0.01	0.003	Blood	3/1	IRIS	3/8/01
Organics							
Acetone	0.10	1	0.1	Liver and kidney	1000/1	IRIS	3/8/01
Benzene	0.003	1	0.003	--	--	NCEA[d]	NA
bis[2-ethylhexyl]phthalate	0.02	1	0.02	Increased liver weight	1000/1	IRIS	3/8/01
Chloroethane	0.4	0.9	0.4	--	--	NCEA[d]	NA
Chlorobenzene	0.02	1	0.02	Liver	1000/1	IRIS	2/13/01

Table 5-2. (cont.)

Chemical of Concern	Oral Chronic RfD (mg/kg-day)	Dermal Adjustment Factor[a]	Adjusted Dermal RfD[b] (mg/kg-day)	Primary Target Organ or System	Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[c], (MM/DD/YY)
1,4-Dichlorobenzene	0.03	1	0.03	--	--	NCEA[d]	NA
1,2-Dichloroethene, isomers	0.02	1	0.02	Serum enzymes	1000/1	IRIS	3/8/01
4-Methyl-2-pentanone	0.08	1	0.08	--	--	HEAST[d]	NA
4-Methylphenol	0.005	1	0.005	--	--	HEAST[d]	NA
Toluene	0.2	1	0.2	Liver and kidney weight	1000/1	IRIS	3/8/01
Xylene isomers (total)	2	1	2	Hyperactivity, body weight, mortality	100/1	IRIS	3/8/01
PAHs							
2-Methylnaphthalene (as naphthalene)	0.02	1	0.02	--	--	NCEA[d]	NA
Naphthalene	0.02	1	0.02	Body weight	3000/1	IRIS	3/8/01
PCBs							
Aroclor® 1254	0.00002	1	0.00002	Immunologic	300/1	IRIS	12/29/00

Note: -- - not available
EPA - U.S. Environmental Protection Agency
NA - not applicable
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
RfD - reference dose

[a] See Table 4-8 for references for dermal adjustment factors.

[b] Consistent with U.S. EPA (1999a), where oral absorption is less than 50 percent, oral RfDs are adjusted by multiplying by the oral-to-dermal adjustment factor.

[c] Date represents: IRIS - date is when IRIS was searched; HEAST - Publication date; NCEA - article date.

[d] Source as cited by U.S. EPA Region IX (U.S. EPA, 2001).

[e] RfDs are available for cadmium in food or water. The RfD shown is for cadmium in water because cadmium is of potential concern in surface water only.

[f] Because the chemical forms of chromium present are not known, the human health risk assessment conservatively assumes that all chromium is present as chromium(VI).

[g] This is a reference concentration for elemental mercury to be used for vapor inhalation only. There is no RfD for elemental mercury.

Table 6-1. Summary of total excess lifetime cancer risks for reasonable maximum exposure scenarios

DRAFT

Receptor/Exposure Pathway	Cancer Risk	Percent Contribution by Pathway	Cancer Risk	Percent Contribution by Pathway	Chemicals Accounting for 90 percent of Cancer Risk for each Pathway
Developed Area	**Adult**		**Older Child**		
Long-Term Worker - Current					
Surface Soil - unpaved					
Ingestion of Surface Soil	4E-6	10%	NA	--	Arsenic, PAHs
Dermal Contact with Surface Soil	2E-6	6%	NA	--	PAHs, arsenic
Total - Surface Soil:	6E-6				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-5	84%	NA	--	Arsenic, benzene
Dermal Contact with Groundwater	3E-9	0.01%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-5				
Total for Long-term Worker:	**4E-5**	100%			
Long-Term Worker - Future					
Surface Soil - paved and unpaved					
Ingestion of Surface Soil	4E-6	11%	NA	--	Arsenic, PAHs
Dermal Contact with Surface Soil	3E-6	8.6%	NA	--	PAHs, arsenic
Total - Surface Soil:	8E-6				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-5	81%	NA	--	Arsenic, benzene
Dermal Contact with Groundwater	3E-9	0.01%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-5				
Total for Long-term Worker:	**4E-5**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	2E-8	34%	NA	--	Arsenic
Dermal Contact with Subsurface Soil	4E-8	66%	NA	--	Arsenic, PCBs
Total for Construction Worker:	**6E-8**	100%			
Undeveloped Area					
Long-Term Worker - Future					
Surface Soil					
Ingestion of Surface Soil	9E-6	18%	NA	--	PAHs, arsenic, PCBs
Dermal Contact with Surface Soil	1E-5	22%	NA	--	PAHs, PCBs, arsenic
Total Cancer Risk Estimate- Surface Soil:	2E-5				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-5	61%	NA	--	Arsenic, benzene
Dermal Contact with Groundwater	3E-9	0.005%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-5				
Total for Long-Term Worker:	**5E-5**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	9E-8	20%	NA	--	Arsenic, PAHs, PCBs
Dermal Contact with Subsurface Soil	4E-7	80%	NA	--	PAHs, PCBs, arsenic
Total for Construction Worker:	**5E-7**	100%			
Trespassers - Current/Future					
Exposure to Surface Soil					
Ingestion of Surface Soil	1E-6	72%	5E-7	49%	PAHs, arsenic, PCBs
Dermal Contact with Surface Soil	5E-7	28%	5E-7	51%	PAHs, PCBs, arsenic [child-PAHs, BEHP, PCBs]
Total for Trespassers - Surface Soil:	2E-6	100%	1E-6	100%	
Contact with Surface Water and Sediments in OU1					
Ingestion of Sediments	8E-7	73%	3E-7	56%	PAHs, arsenic
Dermal Contact with Sediments	3E-7	27%	3E-7	44%	PAHs, arsenic
Ingestion of Surface Water	0E+0	0%	0E+0	0%	No carcinogens detected
Dermal Contact with Surface Water	0E+0	0%	0E+0	0%	No carcinogens detected
Total for Trespassers - Sediments/ Surface Water:	1E-6	100%	6E-7	100%	

Note:

PAH - Polycyclic aromatic hydrocarbons

PCB - Polychlorinated biphenyls

Table 6-2. Summary of total excess lifetime cancer risks for typical exposure scenarios **DRAFT**

Receptor/Exposure Pathway	Cancer Risk	Percent Contribution by Pathway	Cancer Risk	Percent Contribution by Pathway	Chemicals Accounting for 90 percent of Cancer Risk for each Pathway
Developed Area	**Adult**		**Older Child**		
Long-Term Worker - Current					
Surface Soil - unpaved					
Ingestion of Surface Soil	1E-6	21%	NA	--	Arsenic, PAHs
Dermal Contact with Surface Soil	6E-7	14%	NA	--	PAHs, arsenic
Total - Surface Soil:	2E-6				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-6	65%	NA	--	Arsenic
Dermal Contact with Groundwater	9E-10	0.02%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-6				
Total for Long-term Worker:	**5E-6**	100%			
Long-Term Worker - Future					
Surface Soil - paved and unpaved					
Ingestion of Surface Soil	1E-6	23%	NA	--	Arsenic, PAHs
Dermal Contact with Surface Soil	9E-7	18%	NA	--	PAHs, arsenic
Total - Surface Soil:	2E-6				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-6	59%	NA	--	Arsenic
Dermal Contact with Groundwater	9E-10	0.02%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-6				
Total for Long-term Worker:	**5E-6**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	8E-9	67%	NA	--	Arsenic
Dermal Contact with Subsurface Soil	4E-9	33%	NA	--	Arsenic, PCBs
Total for Construction Worker:	**1E-8**	100%			
Undeveloped Area					
Long-Term Worker - Future					
Surface Soil					
Ingestion of Surface Soil	2E-6	29%	NA	--	PAHs, arsenic, PCBs
Dermal Contact with Surface Soil	3E-6	36%	NA	--	PAHs, PCBs, arsenic
Total Cancer Risk Estimate- Surface Soil:	5E-6				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3E-6	35%	NA	--	Arsenic
Dermal Contact with Groundwater	9E-10	0.01%	NA	--	Benzene, arsenic, 1,4-dichlorobenzene
Total - Groundwater:	3E-6				
Total for Long-Term Worker:	**8E-6**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	3.6E-8	49%	NA	--	Arsenic, PAHs, PCBs
Dermal Contact with Subsurface Soil	3.6E-8	51%	NA	--	PAHs, PCBs, arsenic
Total for Construction Worker:	**7E-8**	100%			
Trespassers - Current/Future					
Exposure to Surface Soil					
Ingestion of Surface Soil	7E-8	60%	9E-8	38%	PAHs, arsenic, PCBs
Dermal Contact with Surface Soil	4E-8	40%	2E-7	62%	PAHs, PCBs, arsenic [child-PAHs, BEHP, PCBs]
Total for Trespassers - Surface Soil:	1E-7	100%	3E-7	100%	
Contact with Surface Water and Sediments in OU1					
Ingestion of Sediments	4E-8	61%	6E-8	43%	PAHs, arsenic
Dermal Contact with Sediments	3E-8	39%	8E-8	57%	PAHS, arsenic, PCBs
Ingestion of Surface Water	0E+0	0%	0E+0	0%	No carcinogens detected
Dermal Contact with Surface Water	0E+0	0%	0E+0	0%	No carcinogens detected
Total for Trespassers - Sediments/ Surface Water:	7E-8	100%	1E-7	100%	

Note:
PAH - Polycyclic aromatic hydrocarbons
PCB - Polychlorinated biphenyls

Table 6-3. Summary of total hazard indices for reasonable maximum exposure scenarios **DRAFT**

Receptor/Exposure Pathway	Hazard Index	Percent Contribution by Pathway	Hazard Index	Percent Contribution by Pathway	Chemicals Accounting for 90 percent of Hazard Indicies for each Pathway
Developed Area		**Adult**		**Older Child**	
Long-Term Worker - Current					
Surface Soil - unpaved					
Inhalation of vapors from soil	0.025	0.6%	NA	--	Mercury
Ingestion of Surface Soil	0.60	14.9%	NA	--	Mercury, iron
Dermal Contact with Surface Soil	0.0071	0.2%	NA	--	Arsenic
Total - Surface Soil:	0.63				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3.4	84.2%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0038	0.09%	NA	--	Iron, manganese, mercury
Total - Groundwater:	3.4				
Total for Long-term Worker:	**4.0**	100%			
Long-Term Worker - Future					
Surface Soil - paved and unpaved					
Inhalation of vapors from soil	0.025	0%	NA	--	Mercury
Ingestion of Surface Soil	3.9	53%	NA	--	Mercury
Dermal Contact with Surface Soil	0.0071	0.10%	NA	--	Arsenic
Total - Surface Soil:	3.91				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3.4	46%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0038	0.05%	NA	--	Iron, manganese, mercury
Total - Groundwater:	3.4				
Total for Long-term Worker:	**7.3**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	0.48	99%	NA	--	Mercury
Dermal Contact with Subsurface Soil	0.003	0.7%	NA	--	Arsenic, cadmium
Total for Construction Worker:	**0.48**	100%			
Undeveloped Area					
Long-Term Worker - Future					
Surface Soil					
Inhalation of vapors from soil	0.025	1%	NA	--	Mercury
Ingestion of Surface Soil	1.1	24%	NA	--	Mercury, iron, chromium
Dermal Contact with Surface Soil	0.017	0.39%	NA	--	Arsenic, cadmium, bis[2-ethylhexyl]phthalate
Total - Surface Soil:	1.1				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	3.4	75%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0038	0.08%	NA	--	Iron, manganese, mercury
Total - Groundwater:	3.4				
Total for Long-Term Worker:	**4.5**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	0.36	95%	NA	--	Mercury
Dermal Contact with Subsurface Soil	0.018	5%	NA	--	PCBs, arsenic
Total for Construction Worker:	**0.38**	100%			
Trespassers - Current/Future					
Exposure to Surface Soil					
Ingestion of Surface Soil	0.12	100%	0.17	97%	Mercury, iron
Dermal Contact with Surface Soil	0.0006	0%	0.005	3%	Arsenic, cadmium, bis[2-ethylhexyl]phthalate [child-BEHP, arsenic]
Total for Trespassers - Surface Soil:	0.12	100%	0.18	100%	
Contact with Surface Water and Sediments					
Ingestion of Sediments	0.24	97.1%	0.34	97.5%	Mercury
Dermal Contact with Sediments	0.00036	0.1%	0.0011	0.3%	Arsenic, cadmium
Ingestion of Surface Water	0.0005	0.2%	0.0007	0.2%	Mercury, manganese
Dermal Contact with Surface Water	0.0062	2.6%	0.0067	1.9%	Mercury, manganese
Total for Trespassers - Sediments/ Surface Water:	0.24	100%	0.34	100%	

Note: PAH - Polycyclic aromatic hydrocarbons PCB - Polychlorinated biphenyls

Table 6-4. Summary of total hazard indices for typical exposure scenarios

Receptor/Exposure Pathway	Hazard Index	Percent Contribution by Pathway	Hazard Index	Percent Contribution by Pathway	Chemicals Accounting for 90 percent of Hazard Indicies for each Pathway
Developed Area	**Adult**		**Older Child**		
Long-Term Worker - Current					
Surface Soil - unpaved					
Inhalation of vapors from soil	0.0049	0%	NA	--	Mercury
Ingestion of Surface Soil	0.60	40%	NA	--	Mercury, iron
Dermal Contact with Surface Soil	0.0071	0.48%	NA	--	Arsenic
Total - Surface Soil:	0.61				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	0.87	59%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0047	0.32%	NA	--	Iron, manganese, mercury
Total - Groundwater:	0.9				
Total for Long-term Worker:	**1.5**	100%			
Long-Term Worker - Future					
Surface Soil - paved and unpaved					
Inhalation of vapors from soil	0.0049	0%	NA	--	Mercury
Ingestion of Surface Soil	3.9	81%	NA	--	Mercury
Dermal Contact with Surface Soil	0.0071	0.15%	NA	--	Arsenic
Total - Surface Soil:	3.9				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	0.87	18%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0047	0.10%	NA	--	Iron, manganese, mercury
Total - Groundwater:	0.9				
Total for Long-term Worker:	**4.8**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	0.0077	96%	NA	--	Mercury
Dermal Contact with Subsurface Soil	0.00032	4.0%	NA	--	Arsenic, cadmium
Total for Construction Worker:	**0.0080**	100%			
Undeveloped Area					
Long-Term Worker - Future					
Surface Soil					
Inhalation of vapors from soil	0.0049	0%	NA	--	Mercury
Ingestion of Surface Soil	1.1	54%	NA	--	Mercury, iron
Dermal Contact with Surface Soil	0.017	0.88%	NA	--	Arsenic, cadmium, bis[2-ethylhexyl]phthalate
Total - Surface Soil:	1.1				
Exposure to Groundwater as Workplace Drinking Water					
Ingestion of Groundwater	0.87	44%	NA	--	Manganese, mercury, iron, thallium, arsenic
Dermal Contact with Groundwater	0.0047	0.24%	NA	--	Iron, manganese, mercury
Total - Groundwater:	0.9				
Total for Long-Term Worker:	**2.0**	100%			
Construction Worker - Current/Future					
Exposure to Subsurface Soil					
Ingestion of Subsurface Soil	0.0057	76%	NA	--	Mercury
Dermal Contact with Subsurface Soil	0.0018	24%	NA	--	PCBs, arsenic
Total for Construction Worker:	**0.0076**	100%			
Trespassers - Current/Future					
Exposure to Surface Soil					
Ingestion of Surface Soil	0.022	99%	0.031	95%	Mercury, iron
Dermal Contact with Surface Soil	0.0002	1%	0.001	5%	Arsenic, cadmium, bis[2-ethylhexyl]phthalate [child-BEHP, arsenic]
Total for Trespassers - Surface Soil:	0.022	100%	0.032	100%	
Contact with Surface Water and Sediments in OU1					
Ingestion of Sediments	0.042	97.3%	0.060	98%	Mercury
Dermal Contact with Sediments	0.0001	0.3%	0.0003	1%	Arsenic, cadmium
Ingestion of Surface Water	0.00009	0.2%	0.0001	0.2%	Mercury, manganese
Dermal Contact with Surface Water	0.0010	2.2%	0.0010	2%	Mercury, manganese
Total for Trespassers - Sediments/ Surface Water:	0.043	100%	0.061	100%	

Note: PAH - Polycyclic aromatic hydrocarbons PCB - Polychlorinated biphenyls

TABLE 6-5. Risk Assessment Summary Reasonable Maximum Exposure Woodridge Site OU1 Developed Area

Scenario Timeframe: Current
Receptor Population: Long-term Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Carcinogenic Risk						Non-Carcinogenic Hazard Quotient						
			Chemical	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk	Chemical	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk
Soil	Soil	Developed Area	Arsenic	3E-6	NA	1E-6	4E-06	66%	Mercury (total)	Immunologic / CNS	0.51	0.02	--	0.53	84%
		Surface Soil	Benz[a]anthracene	4E-8	NA	7E-8	1E-07	2%							
		(unpaved soils)	Benzo[a]pyrene	5E-7	NA	9E-7	1E-06	23%							
			Benzo[b]fluoranthene	1E-7	NA	2E-7	3E-07	4%							
			Dibenz[a,h]anthracene	9E-8	NA	2E-7	2E-07	4%							
			(Total)	4E-6		2E-6	6E-6	100%	(Total)		0.51	0.02	--	0.63	84%
Water	Water	Groundwater	Arsenic	3E-5	NA	7E-10	3E-05	86%	Arsenic	Skin	0.17	NA	0.000007	0.17	5%
		Sitewide	Benzene	4E-6	NA	1E-9	4E-06	12%	Manganese	CNS	1.0	NA	0.0010	1.0	30%
			(Total)	3E-5		3E-9	3E-5	98%	Mercury (total)	Immunologic	0.91	NA	0.0005	0.91	27%
									Iron	NA	0.52	NA	0.0020	0.52	15%
									Thallium	Liver	0.48	NA	0.00002	0.48	14%
									(Total)		3.4		0.0038	3.4	91%

Total Risk Across All Media and Exposure Routes: **4E-05**

Total Hazard Index Across All Media and Exposure Routes: **4.0**

Total CNS HI=	1.0
Total immune HI=	1.4
Total liver HI=	0.48
Total skin HI=	0.17
Total other HI=	0.52

Notes: NA - not applicable

TABLE 6-6. Risk Assessment Summary Reasonable Maximum Exposure Woodridge Site OU1 Developed Area

Scenario Timeframe: Future
Receptor Population: Long-term Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Carcinogenic Risk						Non-Carcinogenic Hazard Quotient						
			Chemical	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk	Chemical	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk
Soil	Soil	Developed Area	Arsenic	3E-6	NA	1E-6	4E-06	53%	Mercury (total)	Immunologic / CNS	3.8	0.02	--	3.8	97%
		Surface Soil	Benz[a]anthracene	1E-7	NA	2E-7	3E-07	4%							
		(all soils)	Benzo[a]pyrene	9E-7	NA	1E-6	2E-06	31%							
			Benzo[b]fluoranthene	1E-7	NA	2E-7	4E-07	5%							
			Dibenz[a,h]anthracene	2E-7	NA	3E-7	5E-07	7%							
			(Total)	4E-6		3E-6	8E-6	100%	(Total)		3.8	0.02	--	3.9	97%
Water	Water	Groundwater	Arsenic	3E-5	NA	7E-10	3E-05	86%	Arsenic	Skin	0.17	NA	0.000007	0.17	5%
		Sitewide	Benzene	4E-6	NA	1E-9	4E-06	12%	Manganese	CNS	1.0	NA	0.0010	1.0	30%
			(Total)	3E-5		3E-9	3E-5	98%	Mercury (total)	Immunologic	0.91	NA	0.0005	0.91	27%
									Iron	NA	0.52	NA	0.0020	0.52	15%
									Thallium	Liver	0.48	NA	0.00002	0.48	14%
									(Total)		3.4		0.0038	3.4	91%

Total Risk Across All Media and Exposure Routes: **4E-05**

Total Hazard Index Across All Media and Exposure Routes: **7.3**

Total CNS HI=	1.0
Total immune HI=	4.7
Total liver HI=	0.48
Total skin HI=	0.17
Total other HI=	0.52

Notes: NA - not applicable

TABLE 6-7. Risk Assessment Summary Reasonable Maximum Exposure Woodridge Site OU1 Undeveloped Area

Scenario Timeframe: Future
Receptor Population: Long-term Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Carcinogenic Risk						Non-Carcinogenic Hazard Quotient						
			Chemical	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk	Chemical	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	Percentage of total pathway risk
Soil	Soil	Undeveloped Area Surface Soil	Arsenic	3E-6	NA	6E-8	3E-06	17%	Mercury (total)	Immunologic / CNS	0.9	0.02	--	0.9	81%
			Benzo[a]pyrene	3E-6	NA	5E-6	7E-06	35%							
			Dibenz[a,h]anthracene	6E-7	NA	3E-7	9E-07	4%							
			PCBs	2E-6	NA	3E-6	3E-06	21%							
			(Total)	9E-6		1E-5	2E-5	78%			0.9	0.02	--	1.1	81%
Water	Water	Groundwater Sitewide	Arsenic	3E-5	NA	7E-10	3E-05	86%	Arsenic	Skin	0.17	NA	0.00001	0.17	5%
			Benzene	4E-6	NA	1E-9	4E-06	12%	Iron	NA	0.52	NA	0.002	0.52	15%
			(Total)	3E-5		3E-9	3E-5	98%	Manganese	CNS	1.0	NA	0.0010	1.0	30%
									Mercury (total)	Immunologic	0.91	NA	0.0005	0.91	27%
									(Total)		3.4		0.004	3.4	77%
			Total Risk Across All Media and Exposure Routes:				5E-05		Total Hazard Index Across All Media and Exposure Routes:					4.5	

Total CNS HI=	1.0
Total immunologic HI=	1.8
Total skin HI=	0.17
Total other HI=	0.52

Notes: NA - not applicable

Appendix A

Data Analysis and Exposure Point Concentrations

Table A-1. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Surface soil
Exposure Point:	Developed Area surface soil

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
7429-90-5	Aluminum	3370		12000		mg/kg	SS-16	9/9	–	12000	N/A	7600	N			**Yes**	ASL
7440-36-0	Antimony	–		–		mg/kg	–	0/12	0.69–6.7	ND	0.05	3.1	N			No	IFD
7440-38-2	Arsenic	2.7	J	11		mg/kg	SS-14	7/10	0.85–3.4	11	10.7	0.39	C			**Yes**	ASL
7440-39-3	Barium	26.9	J	304		mg/kg	MW-15	10/10	–	304	N/A	540	N			No	BSL
7440-41-7	Beryllium	0.68		0.68		mg/kg	SS-14	1/9	0.26–0.52	0.68	1.16	15	N			No	BSL
7440-43-9	Cadmium	0.22	J	3.4		mg/kg	MW-15	7/13	0.047–0.54	3.4	0.32	3.7	N			No	BSL
7440-70-2	Calcium	900	J	31000		mg/kg	SS-14	9/9	–	31000	N/A	N/A				No	NUT
7440-47-3	Chromium	6.6	J	131		mg/kg	MW-15	10/10	–	131	18.7	23	N[b]			**Yes**	ASL
7440-48-4	Cobalt	2.5		12.6		mg/kg	SS-16	9/9	–	12.6	N/A	470	N			No	BSL
7440-50-8	Copper	12.4	J	7420		mg/kg	MW-15	13/13	–	7420	28.4	290	N			**Yes**	ASL
7439-89-6	Iron	3900	J	23900		mg/kg	MW-15	10/10	–	23900	N/A	2300	N			**Yes**	ASL
7439-92-1	Lead	17.8	J	390		mg/kg	SS-14	13/13	–	390	100	40	N			**Yes**	ASL[c]
7439-95-4	Magnesium	771	J	11000		mg/kg	SS-16	9/9	–	11000	N/A	N/A				No	NUT
7439-96-5	Manganese	110	J	540	J	mg/kg	SS-14	10/10	–	540	846	180	N			**Yes**	ASL
7439-97-6	Mercury (total)	9.3		13800		mg/kg	SS-04	15/15	–	13800	0.14	2.3	N			**Yes**	ASL
7440-02-0	Nickel	4.7	J	87.8		mg/kg	MW-15	8/10	7.5–11.6	87.8	14.9	160	N			No	BSL
7440-09-7	Potassium	238		1500		mg/kg	SS-14	9/9	–	1500	N/A	N/A				No	NUT
7782-49-2	Selenium	0.69		1.1		mg/kg	MW-15	2/10	0.49–1.6	1.1	0.17	39	N			No	BSL
7440-22-4	Silver	0.56	J	9.6		mg/kg	MW-15	6/10	0.4–1.9	9.6	0.26	39	N			No	BSL
7440-23-5	Sodium	630		630		mg/kg	SS-16	1/9	250–290	630	N/A	N/A				No	NUT
7440-28-0	Thallium	1.2		5.4		mg/kg	MW-15	2/13	0.83–3.9	5.4	0.19	0.52	N			**Yes**	ASL
7440-62-2	Vanadium	6		140		mg/kg	SS-14	9/9	–	140	34.4	55	N			**Yes**	ASL
7440-66-6	Zinc	89	J	2110		mg/kg	MW-15	13/13	–	2110	82.6	2300	N			No	BSL
120-82-1	1,2,4-Trichlorobenzene	–		–		µg/kg	–	0/9	340–720	ND		65000	N			No	IFD
95-50-1	1,2-Dichlorobenzene	–		–		µg/kg	–	0/9	340–720	ND		90000	N			No	IFD
541-73-1	1,3-Dichlorobenzene	–		–		µg/kg	–	0/9	340–720	ND		1300	N			No	IFD
106-46-7	1,4-Dichlorobenzene	–		–		µg/kg	–	0/9	340–720	ND		3400	C			No	IFD
108-60-1	2,2'-Oxybis[1-chloropropane]	–		–		µg/kg	–	0/9	340–720	ND		2900	C			No	IFD
95-95-4	2,4,5-Trichlorophenol	–		–		µg/kg	–	0/9	860–1800	ND		610000	N			No	IFD
88-06-2	2,4,6-Trichlorophenol	–		–		µg/kg	–	0/9	340–720	ND		44000	C			No	IFD
120-83-2	2,4-Dichlorophenol	–		–		µg/kg	–	0/9	340–720	ND		18000	N			No	IFD
105-67-9	2,4-Dimethylphenol	–		–		µg/kg	–	0/9	340–720	ND		120000	N			No	IFD
51-28-5	2,4-Dinitrophenol	–		–		µg/kg	–	0/9	860–1800	ND		12000	N			No	IFD
121-14-2	2,4-Dinitrotoluene	–		–		µg/kg	–	0/9	340–720	ND		12000	N			No	IFD
606-20-2	2,6-Dinitrotoluene	–		–		µg/kg	–	0/9	340–720	ND		6100	N			No	IFD
91-58-7	2-Chloronaphthalene	–		–		µg/kg	–	0/9	340–720	ND		390000	N			No	IFD
95-57-8	2-Chlorophenol	–		–		µg/kg	–	0/9	340–720	ND		6300	N			No	IFD
534-52-1	2-Methyl-4,6-dinitrophenol	–		–		µg/kg	–	0/9	860–1800	ND		N/A	N			No	IFD
95-48-7	2-Methylphenol	–		–		µg/kg	–	0/9	340–720	ND		310000	N			No	IFD
88-74-4	2-Nitroaniline	–		–		µg/kg	–	0/9	860–1800	ND		350	N			No	IFD
88-75-5	2-Nitrophenol	–		–		µg/kg	–	0/9	340–720	ND		N/A				No	IFD
91-94-1	3,3'-Dichlorobenzidine	–		–		µg/kg	–	0/9	340–720	ND		1100	C			No	IFD
99-09-2	3-Nitroaniline	–		–		µg/kg	–	0/9	860–1800	ND		N/A				No	IFD

Table A-1. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
101-55-3	4-Bromophenyl-phenyl ether	–		–		µg/kg	–	0/9	340–720	ND		N/A				No	IFD
59-50-7	4-Chloro-3-methylphenol	–		–		µg/kg	–	0/9	340–720	ND		N/A				No	IFD
106-47-8	4-Chloroaniline	–		–		µg/kg	–	0/9	340–720	ND		24000	N			No	IFD
7005-72-3	4-Chlorophenyl-phenyl ether	–		–		µg/kg	–	0/9	340–720	ND		N/A				No	IFD
106-44-5	4-Methylphenol	–		–		µg/kg	–	0/9	340–720	ND		31000	N			No	IFD
100-01-6	4-Nitroaniline	–		–		µg/kg	–	0/9	860–1800	ND		N/A	N			No	IFD
100-02-7	4-Nitrophenol	–		–		µg/kg	–	0/9	860–1800	ND		49000	N			No	IFD
111-91-1	bis[2-chloroethoxy]methane	–		–		µg/kg	–	0/9	340–720	ND		N/A	C			No	IFD
111-44-4	bis[2-chloroethyl]ether	–		–		µg/kg	–	0/9	340–720	ND		210	C			No	IFD
117-81-7	bis[2-Ethylhexyl]phthalate	310		10800		µg/kg	WS-19	11/12	400–400	10800		35000	C			No	BSL
85-68-7	Butylbenzyl phthalate	150		150		µg/kg	SS-16	1/9	340–720	150		1200000	N			No	BSL
86-74-8	Carbazole	72		72		µg/kg	SS-03	1/9	360–720	72		24000	C			No	BSL
132-64-9	Dibenzofuran	80		80		µg/kg	SS-03	1/9	360–720	80		29000	N			No	BSL
84-66-2	Diethyl phthalate	–		–		µg/kg	–	0/9	340–720	ND		4900000	N			No	IFD
131-11-3	Dimethyl phthalate	–		–		µg/kg	–	0/9	340–720	ND		61000000	N			No	IFD
84-74-2	Di-n-butyl phthalate	1000		1000		µg/kg	SS-16	1/9	340–720	1000		610000	N			No	BSL
117-84-0	Di-n-octyl phthalate	–		–		µg/kg	–	0/9	340–720	ND		120000	N			No	IFD
118-74-1	Hexachlorobenzene	–		–		µg/kg	–	0/9	340–720	ND		300	C			No	IFD
87-68-3	Hexachlorobutadiene	–		–		µg/kg	–	0/9	340–720	ND		1800	N			No	IFD
77-47-4	Hexachlorocyclopentadiene	–		–		µg/kg	–	0/9	340–720	ND		42000	N			No	IFD
67-72-1	Hexachloroethane	–		–		µg/kg	–	0/9	340–720	ND		6100	N			No	IFD
78-59-1	Isophorone	–		–		µg/kg	–	0/9	340–720	ND		510000	C			No	IFD
98-95-3	Nitrobenzene	–		–		µg/kg	–	0/9	340–720	ND		2000	N			No	IFD
621-64-7	N-nitroso-di-n-propylamine	–		–		µg/kg	–	0/9	340–720	ND		69	C			No	IFD
86-30-6	N-nitrosodiphenylamine	51		51		µg/kg	SS-03	1/9	360–720	51		99000	C			No	BSL
87-86-5	Pentachlorophenol	–		–		µg/kg	–	0/9	860–1800	ND		3000	C			No	IFD
108-95-2	Phenol	150		150		µg/kg	SS-05	1/9	340–480	150		3700000	N			No	BSL
71-55-6	1,1,1-Trichloroethane	–		–		µg/kg	–	0/9	10–14	ND		63000	N			No	IFD
79-34-5	1,1,2,2-Tetrachloroethane	–		–		µg/kg	–	0/9	10–14	ND		380	C			No	IFD
79-00-5	1,1,2-Trichloroethane	–		–		µg/kg	–	0/9	10–14	ND		840	C			No	IFD
75-34-3	1,1-Dichloroethane	–		–		µg/kg	–	0/9	10–14	ND		59000	N			No	IFD
75-35-4	1,1-Dichloroethene	–		–		µg/kg	–	0/9	10–14	ND		54	C			No	IFD
107-06-2	1,2-Dichloroethane	–		–		µg/kg	–	0/9	10–14	ND		350	C			No	IFD
540-59-0	1,2-Dichloroethene isomers (total)	–		–		µg/kg	–	0/9	10–14	ND		4.3	N			No	IFD
78-87-5	1,2-Dichloropropane	–		–		µg/kg	–	0/9	10–14	ND		350	C			No	IFD
78-93-3	2-Butanone	5	J	7	J	µg/kg	SS-05	2/9	11–14	7		730000	N			No	BSL
591-78-6	2-Hexanone	–		–		µg/kg	–	0/9	10–14	ND		N/A				No	IFD
108-10-1	4-Methyl-2-pentanone	–		–		µg/kg	–	0/9	10–14	ND		79000	N			No	IFD
67-64-1	Acetone	8	J	8	J	µg/kg	SS-15	1/9	4–35	8		160000	N			No	BSL
71-43-2	Benzene	5		2800	J	µg/kg	MW-15	4/10	11–14	2800		650	C			Yes	ASL
75-27-4	Bromodichloromethane	–		–		µg/kg	–	0/9	10–14	ND		1000	C			No	IFD
75-25-2	Bromoform	–		–		µg/kg	–	0/9	10–14	ND		62000	C			No	IFD
74-83-9	Bromomethane	–		–		µg/kg	–	0/9	10–14	ND		390	N			No	IFD
75-15-0	Carbon disulfide	–		–		µg/kg	–	0/9	10–14	ND		36000	N			No	IFD
56-23-5	Carbon tetrachloride	–		–		µg/kg	–	0/9	10–14	ND		210	N			No	IFD
108-90-7	Chlorobenzene	1.2	J	1.2	J	µg/kg	MW-15	1/10	10–14	1.2		15000	N			No	BSL
75-00-3	Chloroethane	–		–		µg/kg	–	0/9	10–14	ND		3000	C			No	IFD

Table A-1. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
67-66-3	Chloroform	–		–		µg/kg	–	0/9	10–14	ND		39	N			No	IFD
74-87-3	Chloromethane	–		–		µg/kg	–	0/9	10–14	ND		1200	C			No	IFD
10061-01-5	cis-1,3-Dichloropropene	–		–		µg/kg	–	0/9	10–14	ND		700	C			No	IFD
124-48-1	Dibromochloromethane	–		–		µg/kg	–	0/9	10–14	ND		1100	C			No	IFD
100-41-4	Ethylbenzene	–		–		µg/kg	–	0/9	10–14	ND		150000	N			No	IFD
136777-61-2	meta & para Xylenes	17	J	17	J	µg/kg	MW-15	1/1	–	17		140000	N			No	BSL
75-09-2	Methylene chloride	–		–		µg/kg	–	0/9	3–14	ND		8900	C			No	IFD
95-47-6	ortho-Xylene	20	J	20	J	µg/kg	MW-15	1/1	–	20		140000	N			No	BSL
100-42-5	Styrene	–		–		µg/kg	–	0/9	10–14	ND		1700000	N			No	IFD
127-18-4	Tetrachloroethene	–		–		µg/kg	–	0/9	10–14	ND		5700	C			No	IFD
108-88-3	Toluene	11	J	11	J	µg/kg	MW-15	1/10	10–14	11		520000	N			No	BSL
10061-02-6	trans-1,3-Dichloropropene	–		–		µg/kg	–	0/9	10–14	ND		700	N			No	IFD
79-01-6	Trichloroethene	2		2		µg/kg	SS-04	1/9	10–14	2		2300	N			No	BSL
75-01-4	Vinyl chloride	–		–		µg/kg	–	0/9	10–14	ND		150	N			No	IFD
1330-20-7	Xylene isomers (total)	–		–		µg/kg	–	0/9	10–14	ND		210000	N			No	IFD
	PAHS																
91-57-6	2-Methylnaphthalene	60		190		µg/kg	SS-03	3/9	360–720	190		5600	N[d]			No	BSL
83-32-9	Acenaphthene	40		230		µg/kg	SS-14	6/9	360–480	230		370000	N			No	BSL
208-96-8	Acenaphthylene	53		69		µg/kg	SS-03	2/9	360–720	69		5600	N[d]			No	BSL
120-12-7	Anthracene	40		460		µg/kg	SS-03	7/9	370–400	460		2200000	N			No	BSL
56-55-3	Benz[a]anthracene	150		1400		µg/kg	SS-03	10/12	370–400	1400		620	C			Yes	ASL
50-32-8	Benzo[a]pyrene	120		1100		µg/kg	SS-03	10/12	370–400	1100		62	C			Yes	ASL
205-99-2	Benzo[b]fluoranthene	73		1400		µg/kg	SS-03	11/12	370–370	1400		620	C			Yes	ASL
191-24-2	Benzo[ghi]perylene	96		520		µg/kg	SS-03	7/9	370–400	520		5600	N[d]			No	BSL
207-08-9	Benzo[k]fluoranthene	51		565	J	µg/kg	WS-18	11/12	400–400	565		6200	C			No	BSL
218-01-9	Chrysene	56		1400		µg/kg	SS-03	8/9	370–370	1400		62000	C			No	BSL
53-70-3	Dibenz[a,h]anthracene	50		150		µg/kg	SS-03	6/12	170–400	150		62	C			Yes	ASL
206-44-0	Fluoranthene	94		2600		µg/kg	SS-03	9/9	–	2600		230000	N			No	BSL
86-73-7	Fluorene	41		370		µg/kg	SS-14	7/9	370–480	370		260000	N			No	BSL
193-39-5	Indeno[1,2,3-cd]pyrene	75		470		µg/kg	SS-03	10/12	370–400	470		620	C			No	BSL
91-20-3	Naphthalene	92		94		µg/kg	SS-03	2/9	360–720	94		5600	N			No	BSL
85-01-8	Phenanthrene	160		2500		µg/kg	SS-03	7/9	370–400	2500		5600	N[d]			No	BSL
129-00-0	Pyrene	43		2600		µg/kg	SS-03	9/9	–	2600		230000	N			No	BSL

Table A-1. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection

Notes: All results reported as dry weight.
For the purposes of screening, field replicates have been averaged.

-- - either no detected or undetected values
C - carcinogenic based on a cancer risk of 1 X 10^{-6}
CoPC - chemical of potential concern
J - estimated value
N - noncarcinogenic based on hazard quotient of 0.1
N/A - not applicable
ND - not detected

Rationale Codes:

Selection Reason:
ASL - above screening levels
HIST - infrequent detection but associated historically

Deletion Reason:
BKG - below or consistent with background levels
BSL - below screening level
IFD - infrequent detection
NTX - no toxicity information
NUT - essential nutrient

[a] Screening toxicity values for soil are the PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.
[b] This default carcinogenic screening value for chromium is that for chromium IV.
[c] Lead has been evaluated qualitatively.
[d] This default screening value is that for naphthalene, the noncarcinogenic PAH with the most stringent RBC/PRG.

Table A-2. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

DRAFT

Scenario Timeframe	Current/Future
Medium:	Soil/sediment
Exposure Medium:	Surface soil/sediment
Exposure Point:	Undeveloped Area surface soil/sediment

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
	INORGANICS															
7429-90-5	Aluminum	3580		13900		mg/kg	SD-09	26/26	–	13900	N/A	7600 N			**Yes**	ASL
7440-36-0	Antimony	0.79		53.7		mg/kg	SS-11	18/26	0.76–3.2	53.7	0.05	3.1 N			**Yes**	ASL
7440-38-2	Arsenic	2.6		26.4		mg/kg	MW-14	26/30	1.4–2.9	26.4	10.7	0.39 C			**Yes**	ASL
7440-39-3	Barium	33.3	J	608	J	mg/kg	SS-11	30/30	–	608	N/A	540 N			**Yes**	ASL
7440-41-7	Beryllium	0.35		0.83		mg/kg	SD-09	2/26	0.21–0.68	0.83	1.16	15 N			No	BSL
7440-43-9	Cadmium	0.25	J	21.2	J	mg/kg	SS-24	21/30	0.098–3.4	21.2	0.32	3.7 N			**Yes**	ASL
7440-70-2	Calcium	1340		104000	J	mg/kg	SS-25	24/26	532–664	104000	N/A	N/A			No	NUT
7440-47-3	Chromium	11.3	J	1150	J	mg/kg	SS-17	31/31	–	1150	18.7	23 N[b]			**Yes**	ASL
7440-48-4	Cobalt	2.7		14.4		mg/kg	SS-27	25/26	1.6–1.6	14.4	N/A	470 N			No	BSL
7440-50-8	Copper	22.8	J	1010	J	mg/kg	SS-24	31/31	–	1010	28.4	290 N			**Yes**	ASL
7439-89-6	Iron	5530	J	122000	J	mg/kg	SS-27	30/30	–	122000	N/A	2300 N			**Yes**	ASL
7439-92-1	Lead	39.3	J	4320	J	mg/kg	SS-17	30/30	–	4320	100	40 N			**Yes**	ASL[c]
7439-95-4	Magnesium	465		12400	J	mg/kg	SS-29	26/26	–	12400	N/A	N/A			No	NUT
7439-96-5	Manganese	66.3	J	3090	J	mg/kg	SS-24	30/30	–	3090	846	180 N			**Yes**	ASL
7439-97-6	Mercury (total)	1.2		1290		mg/kg	SD-08	40/40	–	1290	0.14	2.3 N			**Yes**	ASL
16056-34-1	Methyl mercury	0.00059		0.322		mg/kg	SS-20	14/14	–	0.322	N/A	0.61 N			No	BSL
7440-02-0	Nickel	11.4		193		mg/kg	MW-7	29/31	6–15.3	193	14.9	160 N			**Yes**	ASL
7440-09-7	Potassium	217		1260		mg/kg	SD-09	26/26	–	1260	N/A	N/A			No	NUT
7782-49-2	Selenium	0.82		2		mg/kg	SS-07	13/30	0.5–2.4	2	0.17	39 N			No	BSL
7440-22-4	Silver	0.54		93.8		mg/kg	SS-07	26/31	0.16–0.5	93.8	0.26	39 N			**Yes**	ASL
7440-23-5	Sodium	592		2580		mg/kg	SS-32	3/26	254–1130	2580	N/A	N/A			No	NUT
7440-28-0	Thallium	1.8		21.9		mg/kg	SS-20	6/31	0.52–3.6	21.9	0.19	0.52 N			**Yes**	ASL
7440-62-2	Vanadium	9.9		245		mg/kg	MW-7	27/27	–	245	34.4	55 N			**Yes**	ASL
7440-66-6	Zinc	192	J	25400	J	mg/kg	SS-20	25/31	40.9–476	25400	82.6	2300 N			**Yes**	ASL
	ORGANICS															
	Petroleum hydrocarbons	60		60		mg/kg	SD-08	1/2	94–94	60		N/A			No	NTX
120-82-1	1,2,4-Trichlorobenzene	–		–		µg/kg	–	0/26	330–7200	ND		65000 N			No	IFD
95-50-1	1,2-Dichlorobenzene	–		–		µg/kg	–	0/26	330–7200	ND		90000 N			No	IFD
541-73-1	1,3-Dichlorobenzene	–		–		µg/kg	–	0/26	330–7200	ND		1300 N			No	IFD
106-46-7	1,4-Dichlorobenzene	–		–		µg/kg	–	0/26	330–7200	ND		3400 C			No	IFD
108-60-1	2,2'-Oxybis[1-chloropropane]	–		–		µg/kg	–	0/26	330–7200	ND		2900 C			No	IFD
95-95-4	2,4,5-Trichlorophenol	–		–		µg/kg	–	0/26	800–18000	ND		610000 N			No	IFD
88-06-2	2,4,6-Trichlorophenol	–		–		µg/kg	–	0/26	330–7200	ND		44000 C			No	IFD
120-83-2	2,4-Dichlorophenol	–		–		µg/kg	–	0/26	330–7200	ND		18000 N			No	IFD
105-67-9	2,4-Dimethylphenol	–		–		µg/kg	–	0/26	330–7200	ND		120000 N			No	IFD
51-28-5	2,4-Dinitrophenol	–		–		µg/kg	–	0/26	800–18000	ND		12000 N			No	IFD
121-14-2	2,4-Dinitrotoluene	–		–		µg/kg	–	0/26	330–7200	ND		12000 N			No	IFD

Table A-2. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

DRAFT

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
606-20-2	2,6-Dinitrotoluene	–		–		µg/kg	–	0/26	330–7200	ND		6100	N			No	IFD
91-58-7	2-Chloronaphthalene	–		–		µg/kg	–	0/26	330–7200	ND		390000	N			No	IFD
95-57-8	2-Chlorophenol	–		–		µg/kg	–	0/26	330–7200	ND		6300	N			No	IFD
534-52-1	2-Methyl-4,6-dinitrophenol	–		–		µg/kg	–	0/26	800–18000	ND		N/A				No	IFD
95-48-7	2-Methylphenol	–		–		µg/kg	–	0/26	330–7200	ND		310000	N			No	IFD
88-74-4	2-Nitroaniline	–		–		µg/kg	–	0/26	800–18000	ND		350	N			No	IFD
88-75-5	2-Nitrophenol	–		–		µg/kg	–	0/26	330–7200	ND		N/A				No	IFD
91-94-1	3,3'-Dichlorobenzidine	–		–		µg/kg	–	0/26	330–7200	ND		1100	C			No	IFD
99-09-2	3-Nitroaniline	–		–		µg/kg	–	0/26	800–18000	ND		N/A				No	IFD
101-55-3	4-Bromophenyl-phenyl ether	–		–		µg/kg	–	0/26	330–7200	ND		N/A				No	IFD
59-50-7	4-Chloro-3-methylphenol	–		–		µg/kg	–	0/26	330–7200	ND		N/A				No	IFD
106-47-8	4-Chloroaniline	–		–		µg/kg	–	0/26	330–7200	ND		24000	N			No	IFD
7005-72-3	4-Chlorophenyl-phenyl ether	–		–		µg/kg	–	0/26	330–7200	ND		N/A				No	IFD
106-44-5	4-Methylphenol	–		–		µg/kg	–	0/26	330–7200	ND		31000	N			No	IFD
100-01-6	4-Nitroaniline	–		–		µg/kg	–	0/26	800–18000	ND		N/A				No	IFD
100-02-7	4-Nitrophenol	–		–		µg/kg	–	0/26	800–18000	ND		49000	N			No	IFD
65-85-0	Benzoic acid	0.11		0.11		mg/kg	MW-7	1/1	–	0.11		24000	N			No	BSL
111-91-1	bis[2-chloroethoxy]methane	–		–		µg/kg	–	0/26	330–7200	ND		N/A				No	IFD
111-44-4	bis[2-chloroethyl]ether	–		–		µg/kg	–	0/26	330–7200	ND		210	C			No	IFD
117-81-7	bis[2-Ethylhexyl]phthalate	460		380000		µg/kg	SS-18	14/27	79–1500	380000		35000	C			**Yes**	ASL
85-68-7	Butylbenzyl phthalate	80		1500		µg/kg	SS-24	8/26	350–7200	1500		1200000	N			No	BSL
86-74-8	Carbazole	39		930		µg/kg	SS-29	12/26	350–7200	930		24000	C			No	BSL
132-64-9	Dibenzofuran	37		640		µg/kg	SS-29	5/27	330–7200	640		29000	N			No	BSL
84-66-2	Diethyl phthalate	120		770		µg/kg	SS-24	5/26	330–7200	770		4900000	N			No	BSL
131-11-3	Dimethyl phthalate	65		2000		µg/kg	SS-17	2/26	330–7200	2000		6.1E+07	N			No	BSL
84-74-2	Di-n-butyl phthalate	48		3800		µg/kg	SS-24	18/26	330–7200	3800		610000	N			No	BSL
117-84-0	Di-n-octyl phthalate	280		38000		µg/kg	SS-18	2/26	330–4700	38000		120000	C			No	BSL
118-74-1	Hexachlorobenzene	–		–		µg/kg	–	0/26	330–7200	ND		300	C			No	IFD
87-68-3	Hexachlorobutadiene	–		–		µg/kg	–	0/26	330–7200	ND		1800	N			No	IFD
77-47-4	Hexachlorocyclopentadiene	–		–		µg/kg	–	0/26	330–7200	ND		42000	N			No	IFD
67-72-1	Hexachloroethane	–		–		µg/kg	–	0/26	330–7200	ND		6100	N			No	IFD
78-59-1	Isophorone	–		–		µg/kg	–	0/26	330–7200	ND		510000	C			No	IFD
98-95-3	Nitrobenzene	–		–		µg/kg	–	0/26	330–7200	ND		2000	N			No	IFD
621-64-7	N-nitroso-di-n-propylamine	–		–		µg/kg	–	0/26	330–7200	ND		69	N			No	IFD
86-30-6	N-nitrosodiphenylamine	130		130		µg/kg	SS-19	1/26	330–7200	130		99000	N			No	BSL
87-86-5	Pentachlorophenol	–		–		µg/kg	–	0/26	800–18000	ND		3000	C			No	IFD
108-95-2	Phenol	79		250		µg/kg	SS-10	2/26	330–7200	250		3700000	N			No	BSL
71-55-6	1,1,1-Trichloroethane	–		–		µg/kg	–	0/26	10–48	ND		63000	N			No	IFD
79-34-5	1,1,2,2-Tetrachloroethane	–		–		µg/kg	–	0/26	10–48	ND		380	C			No	IFD
79-00-5	1,1,2-Trichloroethane	–		–		µg/kg	–	0/26	10–48	ND		840	C			No	IFD
75-34-3	1,1-Dichloroethane	–		–		µg/kg	–	0/26	10–48	ND		59000	N			No	IFD
75-35-4	1,1-Dichloroethene	–		–		µg/kg	–	0/26	10–48	ND		54	C			No	IFD
107-06-2	1,2-Dichloroethane	–		–		µg/kg	–	0/26	10–48	ND		350	C			No	IFD
540-59-0	1,2-Dichloroethene isomers (t	–		–		µg/kg	–	0/26	10–48	ND		N/A				No	IFD

Table A-2. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
78-87-5	1,2-Dichloropropane	–		–		µg/kg	–	0/26	10–48	ND		350 C			No	IFD
78-93-3	2-Butanone	–		–		µg/kg	–	0/26	10–48	ND		730000 N			No	IFD
591-78-6	2-Hexanone	–		–		µg/kg	–	0/26	10–48	ND		N/A			No	IFD
108-10-1	4-Methyl-2-pentanone	–		–		µg/kg	–	0/26	10–48	ND		79000 N			No	IFD
67-64-1	Acetone	190	J	190	J	µg/kg	SD-08	1/26	2–290	190		160000 N			No	BSL
71-43-2	Benzene	3.6	J	3.6	J	µg/kg	MW-14	1/27	10–48	3.6		650 C			No	BSL
75-27-4	Bromodichloromethane	–		–		µg/kg	–	0/26	10–48	ND		1000 C			No	IFD
75-25-2	Bromoform	–		–		µg/kg	–	0/26	10–48	ND		62000 C			No	IFD
74-83-9	Bromomethane	–		–		µg/kg	–	0/26	10–48	ND		390 N			No	IFD
75-15-0	Carbon disulfide	–		–		µg/kg	–	0/26	10–48	ND		36000 N			No	IFD
56-23-5	Carbon tetrachloride	–		–		µg/kg	–	0/26	10–48	ND		210 N			No	IFD
108-90-7	Chlorobenzene	–		–		µg/kg	–	0/27	6.3–48	ND		15000 N			No	IFD
75-00-3	Chloroethane	–		–		µg/kg	–	0/26	10–48	ND		3000 C			No	IFD
67-66-3	Chloroform	–		–		µg/kg	–	0/26	10–48	ND		39 N			No	IFD
74-87-3	Chloromethane	–		–		µg/kg	–	0/26	10–48	ND		1200 C			No	IFD
10061-01-5	cis-1,3-Dichloropropene	–		–		µg/kg	–	0/26	10–48	ND		700 C			No	IFD
124-48-1	Dibromochloromethane	–		–		µg/kg	–	0/26	10–48	ND		1100 C			No	IFD
100-41-4	Ethylbenzene	–		–		µg/kg	–	0/26	10–48	ND		150000 N			No	IFD
136777-61-2	meta & para Xylenes	1.3	J	1.3	J	µg/kg	MW-14	1/1	–	1.3		140000 N			No	BSL
75-09-2	Methylene chloride	–		–		µg/kg	–	0/26	3–48	ND		8900 C			No	IFD
95-47-6	ortho-Xylene	–		–		µg/kg	–	0/1	6.3–6.3	ND		140000 N			No	IFD
100-42-5	Styrene	–		–		µg/kg	–	0/26	10–48	ND		460000 N			No	IFD
127-18-4	Tetrachloroethene	–		–		µg/kg	–	0/26	10–48	ND		5700 C			No	IFD
108-88-3	Toluene	2.2	J	2.2	J	µg/kg	MW-14	1/27	10–48	2.2		59000 N			No	BSL
10061-02-6	trans-1,3-Dichloropropene	–		–		µg/kg	–	0/26	10–48	ND		700 C			No	IFD
79-01-6	Trichloroethene	–		–		µg/kg	–	0/26	10–48	ND		2300 N			No	IFD
75-01-4	Vinyl chloride	–		–		µg/kg	–	0/26	10–48	ND		150 C			No	IFD
1330-20-7	Xylene isomers (total)	–		–		µg/kg	–	0/26	10–48	ND		140000 N			No	IFD
	PAHS															
91-57-6	2-Methylnaphthalene	36		120		µg/kg	SS-29	4/27	330–7200	120		5600 N[d]			No	BSL
83-32-9	Acenaphthene	45		1200		µg/kg	SS-29	10/30	350–7200	1200		370000 N			No	BSL
208-96-8	Acenaphthylene	44		490		µg/kg	SD-12	8/30	330–7200	490		5600 N[d]			No	BSL
120-12-7	Anthracene	45		4100		µg/kg	SS-29	22/30	350–7200	4100		2200000 N			No	BSL
56-55-3	Benz[a]anthracene	78		4000		µg/kg	SS-17	27/29	380–7200	4000		620 C			**Yes**	ASL
50-32-8	Benzo[a]pyrene	73		10000		µg/kg	SS-29	28/30	380–7200	10000		62 C			**Yes**	ASL
205-99-2	Benzo[b]fluoranthene	160		13000		µg/kg	SS-29	25/30	380–7200	13000		620 C			**Yes**	ASL
191-24-2	Benzo[ghi]perylene	48		2200		µg/kg	SS-29	27/29	380–7200	2200		5600 N[d]			No	BSL
207-08-9	Benzo[k]fluoranthene	68		4700		µg/kg	SS-29	24/29	380–7200	4700		6200 C			No	BSL
218-01-9	Chrysene	90		12000		µg/kg	SS-29	28/30	380–7200	12000		62000 C			No	BSL
53-70-3	Dibenz[a,h]anthracene	44		900		µg/kg	SS-29	21/29	380–7200	900		62 C			**Yes**	ASL
206-44-0	Fluoranthene	120		26000		µg/kg	SS-29	28/30	380–7200	26000		230000 N			No	BSL
86-73-7	Fluorene	55		1100		µg/kg	SS-29	11/30	350–7200	1100		260000 N			No	BSL
193-39-5	Indeno[1,2,3-cd]pyrene	57		2600		µg/kg	SS-29	26/29	380–7200	2600		620 C			**Yes**	ASL

Table A-2. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
91-20-3	Naphthalene	62		630		µg/kg	SS-24	6/29	330–7200	630		5600 N			No	BSL
85-01-8	Phenanthrene	59		16000		µg/kg	SS-29	28/30	380–7200	16000		5600 N[d]			**Yes**	ASL
129-00-0	Pyrene	42		24000		µg/kg	SS-29	29/30	7200–7200	24000		230000 N			No	BSL
	PCBS															
12674-11-2	Aroclor® 1016	–		–		µg/kg	–	0/2	92–160	ND		390 N			No	IFD
11104-28-2	Aroclor® 1221	–		–		µg/kg	–	0/2	92–160	ND		220 C			No	IFD
11141-16-5	Aroclor® 1232	–		–		µg/kg	–	0/2	92–160	ND		220 C			No	IFD
53469-21-9	Aroclor® 1242	–		–		µg/kg	–	0/2	92–160	ND		220 C			No	IFD
12672-29-6	Aroclor® 1248	190		4400		µg/kg	MW-7	3/3	–	4400		220 C			**Yes**	ASL
11097-69-1	Aroclor® 1254	–		–		µg/kg	–	0/2	92–160	ND		110 N			No	IFD
11096-82-5	Aroclor® 1260	260		490		µg/kg	MW-7	2/2	–	490		220 C			**Yes**	ASL
	Sum 1248 and 1260	450		4400		µg/kg	MW-7	3/3	–	4400		220 C			**Yes**	ASL

Notes: All results reported as dry weight.
For the purposes of screening, field replicates have been averaged.

– - either no detected or undetected values
C - carcinogenic based on a cancer risk of 1 X 10^{-6}
CoPC - chemical of potential concern
J - estimated value
N - noncarcinogenic based on hazard quotient of 0.1
N/A - not applicable
ND - not detected

Rationale Codes:

Selection Reason:
ASL - above screening levels
HIST - infrequent detection but associated historically

Deletion Reason:
BKG - below or consistent with background levels
BSL - below screening level
IFD - infrequent detection
NTX - no toxicity information
NUT - essential nutrient

[a] Screening toxicity values for soil/sediment are the PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.
[b] This default carcinogenic screening value for chromium is that for chromium IV.
[c] Lead has been evaluated qualitatively.
[d] This default screening value is that for naphthalene, the noncarcinogenic PAH with the most stringent RBC/PRG.

Table A-3. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Subsurface soil
Exposure Point:	Subsurface soil (1-20 ft depths in developed and undeveloped areas)

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Region IX Residential Soils[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
	INORGANICS															
7429-90-5	Aluminum	69.2		108000		mg/kg	TP-19	47/47	–	108000	N/A	7600 N			**Yes**	ASL
7440-36-0	Antimony	0.48	J	97.3		mg/kg	TP-13	37/47	0.45–0.71	97.3	0.05	3.1 N			**Yes**	ASL
7440-38-2	Arsenic	1.4		120		mg/kg	TP-15	48/54	0.7–5.8	120	10.7	0.39 C			**Yes**	ASL
7440-39-3	Barium	2.8		11200		mg/kg	TP-15	53/53	–	11200	N/A	540 N			**Yes**	ASL
7440-41-7	Beryllium	1.1		7.4		mg/kg	TP-05	4/47	0.19–1.2	7.4	1.16	15 N			No	BSL
7440-43-9	Cadmium	0.29		36.1		mg/kg	TP-15	52/53	0.17–0.17	36.1	0.32	3.7 N			**Yes**	ASL
7440-70-2	Calcium	319		254000		mg/kg	TP-14	47/47	–	254000	N/A	N/A			No	NUT
7440-47-3	Chromium	6.4		9840		mg/kg	TP-13	53/54	2–2	9840	18.7	23 N[b]			**Yes**	ASL
7440-48-4	Cobalt	0.42		42.5		mg/kg	TP-15	45/47	0.23–0.25	42.5	N/A	470 N			No	BSL
7440-50-8	Copper	3.8	J	10500	J	mg/kg	TP-07	54/55	0.4–0.4	10500	28.4	290 N			**Yes**	ASL
7439-89-6	Iron	1370	J	293000	J	mg/kg	TP-15	53/53	–	293000	N/A	2300 N			**Yes**	ASL
7439-92-1	Lead	5		58200		mg/kg	TP-13	52/53	29–29	58200	100	40 N			**Yes**	ASL[c]
7439-95-4	Magnesium	32.9		9430		mg/kg	TP-16	47/47	–	9430	N/A	N/A			No	NUT
7439-96-5	Manganese	9.3	J	23300	J	mg/kg	TP-03	53/53	–	23300	846	180 N			**Yes**	ASL
7439-97-6	Mercury (total)	0.15		34700		mg/kg	TP-17	129/130	0.15–0.15	34700	0.14	2.3 N			**Yes**	ASL
16056-34-1	Methyl mercury	0.1		7.44		ng/g	TP-13	7/7	–	7.44	N/A	610 N			No	BSL
7440-02-0	Nickel	8		317		mg/kg	TP-15	53/54	0.26–0.26	317	14.9	160 N			**Yes**	ASL
7440-09-7	Potassium	39.4		4120		mg/kg	TP-15	47/47	–	4120	N/A	N/A			No	NUT
7782-49-2	Selenium	0.89		6.4	J	mg/kg	TP-12	18/53	0.43–8.8	6.4	0.17	39 N			No	BSL
7440-22-4	Silver	0.15		1580		mg/kg	TP-05	43/54	0.07–0.36	1580	0.26	39 N			**Yes**	ASL
7440-23-5	Sodium	63		18900		mg/kg	TP-05	26/47	45.7–645	18900	N/A	N/A			No	NUT
7440-28-0	Thallium	0.9		12.9		mg/kg	TP-05	6/54	0.5–8.8	12.9	0.19	0.52 N			**Yes**	ASL
7440-62-2	Vanadium	3		980		mg/kg	TP-12	47/48	1.2–1.2	980	34.4	55 N			**Yes**	ASL
7440-66-6	Zinc	26.8		43200		mg/kg	TP-17	56/56	–	43200	82.6	2300 N			**Yes**	ASL
	ORGANICS															
120-82-1	1,2,4-Trichlorobenzene	–		–		µg/kg	–	0/38	370–1000	ND		65000 N			No	IFD
95-50-1	1,2-Dichlorobenzene	–		–		µg/kg	–	0/38	370–1000	ND		90000 N			No	IFD
541-73-1	1,3-Dichlorobenzene	82		130		µg/kg	TP-17	2/38	370–1000	130		1300 N			No	BSL
106-46-7	1,4-Dichlorobenzene	130		200		µg/kg	TP-10	2/38	370–1000	200		3400 C			No	BSL
108-60-1	2,2'-Oxybis[1-chloropropane]	–		–		µg/kg	–	0/38	370–1000	ND		2900 C			No	IFD
95-95-4	2,4,5-Trichlorophenol	–		–		µg/kg	–	0/38	930–2500	ND		610000 N			No	IFD
88-06-2	2,4,6-Trichlorophenol	66	J	66	J	µg/kg	TP-13	1/38	370–1000	66		44000 C			No	BSL
120-83-2	2,4-Dichlorophenol	–		–		µg/kg	–	0/38	370–1000	ND		18000 N			No	IFD
105-67-9	2,4-Dimethylphenol	200		200		µg/kg	TP-18	1/38	370–1000	200		120000 N			No	BSL
51-28-5	2,4-Dinitrophenol	15	J	15	J	µg/kg	TP-18	1/38	930–2500	15		12000 N			No	BSL
121-14-2	2,4-Dinitrotoluene	–		–		µg/kg	–	0/38	370–1000	ND		12000 N			No	IFD
606-20-2	2,6-Dinitrotoluene	–		–		µg/kg	–	0/38	370–1000	ND		6100 N			No	IFD

Table A-3. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Region IX Residential Soils[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
91-58-7	2-Chloronaphthalene	230		230		µg/kg	TP-10	1/38	370–1000	230		390000 N			No	BSL
95-57-8	2-Chlorophenol	–		–		µg/kg	–	0/38	370–1000	ND		6300 N			No	IFD
534-52-1	2-Methyl-4,6-dinitrophenol	–		–		µg/kg	–	0/38	510–2500	ND		N/A			No	IFD
95-48-7	2-Methylphenol	140		140		µg/kg	TP-18	1/38	370–1000	140		310000 N			No	BSL
88-74-4	2-Nitroaniline	–		–		µg/kg	–	0/38	930–2500	ND		350 N			No	IFD
88-75-5	2-Nitrophenol	–		–		µg/kg	–	0/38	370–1000	ND		N/A			No	IFD
91-94-1	3,3'-Dichlorobenzidine	100		100		µg/kg	TP-18	1/38	370–1000	100		1100 C			No	BSL
99-09-2	3-Nitroaniline	–		–		µg/kg	–	0/38	930–2500	ND		N/A			No	IFD
50-29-3	4,4'-DDT	0.034		0.034		mg/kg	MW-6	1/1	–	0.034		1.7 C			No	BSL
101-55-3	4-Bromophenyl-phenyl ether	–		–		µg/kg	–	0/38	370–1000	ND		N/A			No	IFD
59-50-7	4-Chloro-3-methylphenol	–		–		µg/kg	–	0/38	370–1000	ND		N/A			No	IFD
106-47-8	4-Chloroaniline	–		–		µg/kg	–	0/38	370–1000	ND		24000 N			No	IFD
7005-72-3	4-Chlorophenyl-phenyl ether	–		–		µg/kg	–	0/38	370–1000	ND		N/A			No	IFD
106-44-5	4-Methylphenol	78		410		µg/kg	TP-18	2/38	370–1000	410		31000 N			No	BSL
100-01-6	4-Nitroaniline	–		–		µg/kg	–	0/38	930–2500	ND		N/A			No	IFD
100-02-7	4-Nitrophenol	–		–		µg/kg	–	0/38	930–2500	ND		49000 N			No	IFD
5103-71-9	alpha-Chlordane	0.067		0.067		mg/kg	MW-6	1/1	–	0.067		1.6 C[d]			No	BSL
65-85-0	Benzoic acid	0.013		0.14		mg/kg	MW-9	6/6	–	0.14		24000 N			No	BSL
111-91-1	bis[2-chloroethoxy]methane	–		–		µg/kg	–	0/38	370–1000	ND		N/A			No	IFD
111-44-4	bis[2-chloroethyl]ether	–		–		µg/kg	–	0/38	370–1000	ND		210 C			No	IFD
117-81-7	bis[2-Ethylhexyl]phthalate	95		22000		µg/kg	TP-13	50/56	370–1000	22000		35000 C			No	BSL
85-68-7	Butylbenzyl phthalate	13		1400		µg/kg	MW-4	13/42	71–1000	1400		1200000 N			No	BSL
86-74-8	Carbazole	43		25000		µg/kg	TP-18	12/38	370–1000	25000		24000 C			**Yes**	ASL
132-64-9	Dibenzofuran	3		16000		µg/kg	TP-18	9/41	370–1000	16000		29000 N			No	BSL
84-66-2	Diethyl phthalate	45		660		µg/kg	TP-20	12/41	370–1000	660		4900000 N			No	BSL
131-11-3	Dimethyl phthalate	240		670		µg/kg	TP-08	2/38	370–1000	670		61000000 N			No	BSL
84-74-2	Di-n-butyl phthalate	50		37000	J	µg/kg	TP-08	35/54	370–3800	37000		610000 N			No	BSL
117-84-0	Di-n-octyl phthalate	10		2500		µg/kg	TP-13	4/40	370–1000	2500		120000 C			No	BSL
5103-74-2	gamma-Chlordane	0.061		0.09		mg/kg	MW-5	2/2	–	0.09		1.6 C[d]			No	BSL
118-74-1	Hexachlorobenzene	94		94		µg/kg	TP-09	1/38	370–1000	94		300 C			No	BSL
87-68-3	Hexachlorobutadiene	–		–		µg/kg	–	0/38	370–1000	ND		1800 N			No	IFD
77-47-4	Hexachlorocyclopentadiene	–		–		µg/kg	–	0/38	370–1000	ND		42000 N			No	IFD
67-72-1	Hexachloroethane	–		–		µg/kg	–	0/38	370–1000	ND		6100 N			No	IFD
78-59-1	Isophorone	–		–		µg/kg	–	0/38	370–1000	ND		510000 C			No	IFD
98-95-3	Nitrobenzene	–		–		µg/kg	–	0/38	370–1000	ND		2000 N			No	IFD
621-64-7	N-nitroso-di-n-propylamine	–		–		µg/kg	–	0/38	370–1000	ND		69 N			No	IFD
86-30-6	N-nitrosodiphenylamine	50		230		µg/kg	TP-05	5/38	370–1000	230		99000 N			No	BSL
87-86-5	Pentachlorophenol	67		140	J	µg/kg	TP-09	2/38	930–2500	140		3000 C			No	BSL
108-95-2	Phenol	78		890		µg/kg	MW-8	3/39	370–1000	890		3700000 N			No	BSL
71-55-6	1,1,1-Trichloroethane	–		–		µg/kg	–	0/38	11–30	ND		63000 N			No	IFD
79-34-5	1,1,2,2-Tetrachloroethane	–		–		µg/kg	–	0/38	11–30	ND		380 C			No	IFD
79-00-5	1,1,2-Trichloroethane	–		–		µg/kg	–	0/38	11–30	ND		840 C			No	IFD
75-34-3	1,1-Dichloroethane	–		–		µg/kg	–	0/38	11–30	ND		59000 N			No	IFD

Table A-3. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Region IX Residential Soils[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
75-35-4	1,1-Dichloroethene	–		–		µg/kg	–	0/38	11–30	ND		54 C			No	IFD
107-06-2	1,2-Dichloroethane	–		–		µg/kg	–	0/38	11–30	ND		350 C			No	IFD
540-59-0	1,2-Dichloroethene isomers (to	–		–		µg/kg	–	0/38	11–30	ND		N/A			No	IFD
78-87-5	1,2-Dichloropropane	–		–		µg/kg	–	0/38	11–30	ND		350 C			No	IFD
78-93-3	2-Butanone	85	J	280		µg/kg	MW-6	2/39	11–21	280		730000 N			No	BSL
591-78-6	2-Hexanone	–		–		µg/kg	–	0/38	11–30	ND		N/A			No	IFD
108-10-1	4-Methyl-2-pentanone	–		–		µg/kg	–	0/38	11–30	ND		79000 N			No	IFD
67-64-1	Acetone	8	J	220	J	µg/kg	TP-02	4/38	11–21	220		160000 N			No	BSL
71-43-2	Benzene	1.5		2800	J	µg/kg	MW-15	9/45	11–30	2800		650 C			**Yes**	ASL
75-27-4	Bromodichloromethane	–		–		µg/kg	–	0/38	11–30	ND		1000 C			No	IFD
75-25-2	Bromoform	–		–		µg/kg	–	0/38	11–30	ND		62000 C			No	IFD
74-83-9	Bromomethane	–		–		µg/kg	–	0/38	11–30	ND		390 N			No	IFD
75-15-0	Carbon disulfide	8		8		µg/kg	TP-02	1/38	11–21	8		36000 N			No	BSL
56-23-5	Carbon tetrachloride	–		–		µg/kg	–	0/38	11–30	ND		210 N			No	IFD
108-90-7	Chlorobenzene	1.2	J	10		µg/kg	TP-10	2/44	5.2–30	10		15000 N			No	BSL
75-00-3	Chloroethane	–		–		µg/kg	–	0/38	11–30	ND		3000 C			No	IFD
67-66-3	Chloroform	–		–		µg/kg	–	0/38	11–30	ND		39 N			No	IFD
74-87-3	Chloromethane	–		–		µg/kg	–	0/38	11–30	ND		1200 C			No	IFD
10061-01-5	cis-1,3-Dichloropropene	–		–		µg/kg	–	0/38	11–30	ND		700 C			No	IFD
124-48-1	Dibromochloromethane	–		–		µg/kg	–	0/38	11–30	ND		1100 C			No	IFD
100-41-4	Ethylbenzene	2		910		µg/kg	MW-9	6/41	11–30	910		150000 N			No	BSL
136777-61	meta & para Xylenes	1.3	J	17	J	µg/kg	MW-15	3/6	5.2–8.6	17		140000 N			No	BSL
75-09-2	Methylene chloride	3	J	7.5	J	µg/kg	TP-08	5/38	11–30	7.5		8900 C			No	BSL
95-47-6	ortho-Xylene	20	J	20	J	µg/kg	MW-15	1/6	5.2–8.6	20		140000 N			No	BSL
100-42-5	Styrene	–		–		µg/kg	–	0/38	11–30	ND		460000 N			No	IFD
127-18-4	Tetrachloroethene	–		–		µg/kg	–	0/38	11–30	ND		5700 C			No	IFD
108-88-3	Toluene	2.2	J	70000		µg/kg	TP-13	10/47	5.2–30	70000		59000 N			**Yes**	ASL
10061-02-6	trans-1,3-Dichloropropene	–		–		µg/kg	–	0/38	11–30	ND		700 C			No	IFD
79-01-6	Trichloroethene	–		–		µg/kg	–	0/38	11–30	ND		2300 N			No	IFD
75-01-4	Vinyl chloride	–		–		µg/kg	–	0/38	11–30	ND		150 C			No	IFD
1330-20-7	Xylene isomers (total)	17		110000		µg/kg	TP-13	5/40	11–30	110000		140000 N			No	BSL
	PAHS															
91-57-6	2-Methylnaphthalene	7		11000		µg/kg	MW-9	13/45	370–1000	11000		5600 N[e]			**Yes**	ASL
83-32-9	Acenaphthene	45		36000		µg/kg	TP-18	9/39	370–1000	36000		370000 N			No	BSL
208-96-8	Acenaphthylene	32		241		µg/kg	TP-20	13/40	370–1000	241		5600 N[e]			No	BSL
120-12-7	Anthracene	9		44000		µg/kg	TP-18	28/42	370–1000	44000		2200000 N			No	BSL
56-55-3	Benz[a]anthracene	55		62000		µg/kg	TP-18	30/39	380–1000	62000		620 C			**Yes**	ASL
50-32-8	Benzo[a]pyrene	72		52000		µg/kg	TP-18	29/40	380–1000	52000		62 C			**Yes**	ASL
205-99-2	Benzo[b]fluoranthene	74		64000		µg/kg	TP-18	31/40	380–1000	64000		620 C			**Yes**	ASL
191-24-2	Benzo[ghi]perylene	50		19000		µg/kg	TP-18	28/38	380–1000	19000		5600 N[e]			**Yes**	ASL
207-08-9	Benzo[k]fluoranthene	44		16000		µg/kg	TP-18	25/38	380–1000	16000		6200 C			**Yes**	ASL
218-01-9	Chrysene	27		61000		µg/kg	TP-18	36/44	380–1000	61000		62000 C			No	BSL
53-70-3	Dibenz[a,h]anthracene	53		1300		µg/kg	TP-18	20/38	370–1000	1300		62 C			**Yes**	ASL

Table A-3. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

DRAFT

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Region IX Residential Soils[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
206-44-0	Fluoranthene	23		130000	J	µg/kg	TP-18	39/46	380–1000	130000		230000	N			No	BSL
86-73-7	Fluorene	55		25000		µg/kg	TP-18	12/40	370–1000	25000		260000	N			No	BSL
193-39-5	Indeno[1,2,3-cd]pyrene	45		20000		µg/kg	TP-18	26/38	380–1000	20000		620	C			**Yes**	ASL
91-20-3	Naphthalene	9		22000		µg/kg	TP-18	15/43	370–1000	22000		5600	N			**Yes**	ASL
85-01-8	Phenanthrene	15		140000	J	µg/kg	TP-18	36/46	380–1000	140000		5600	N[e]			**Yes**	ASL
129-00-0	Pyrene	6		86000	J	µg/kg	TP-18	40/47	56–1000	86000		230000	N			No	BSL
	PCBS																
53469-21-9	Aroclor® 1242	0.79		0.79		mg/kg	MW-7	1/1	–	0.79		0.22	C			**Yes**	ASL
12672-29-6	Aroclor® 1248	4.4		4.4		mg/kg	MW-7	1/1	–	4.4		0.22	C			**Yes**	ASL
11097-69-1	Aroclor® 1254	0.55		0.55		mg/kg	MW-5	1/1	–	0.55		0.11	N			**Yes**	ASL
11096-82-5	Aroclor® 1260	0.083		0.36		mg/kg	MW-9	2/2	–	0.36		0.22	C			**Yes**	ASL
11096-82-5	Sum 1242,1248,1254,1260	0.083		5.2		mg/kg	MW-7	3/3	–	5.2		0.22	C			**Yes**	ASL

Notes: All results reported as dry weight.
For the purposes of screening, field replicates have been averaged.

– - either no detected or undetected values
C - carcinogenic based on a cancer risk of 1 X 10^{-6}
CoPC - chemical of potential concern
J - estimated value
N - noncarcinogenic based on hazard quotient of 0.1
N/A - not applicable
ND - not detected

Rationale Codes:

Selection Reason:
ASL - above screening levels
HIST - infrequent detection but associated historically

Deletion Reason:
BKG - below or consistent with background levels
BSL - below screening level
IFD - infrequent detection
NTX - no toxicity information
NUT - essential nutrient

[a] Screening toxicity values for soil are the PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.
[b] This default carcinogenic screening value for chromium is that for chromium IV.
[c] Lead has been evaluated qualitatively.
[d] This default screening value is that for gamma-chlordane.
[e] This default screening value is that for naphthalene, the noncarcinogenic PAH with the most stringent RBC/PRG.

Table A-4. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Water
Exposure Medium:	Surface water
Exposure Point:	Undeveloped Area surface water

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
	INORGANICS																
7429-90-5	Aluminum	–		–		µg/L		0/2	94.8–191	ND	N/A	3600	N			no	IFD
7440-36-0	Antimony	–		–		µg/L		0/2	3.4–3.4	ND	N/A	1.5	N			no	IFD
7440-38-2	Arsenic	–		–		µg/L		0/5	2.4–5.5	ND	N/A	0.045	C			no	IFD
7440-39-3	Barium	40		189		µg/L	SW-09	5/5	–	189	N/A	260	N			no	BSL
7440-41-7	Beryllium	–		–		µg/L		0/2	0.19–0.19	ND	N/A	7.3	N			no	IFD
7440-43-9	Cadmium	1.2		1.2		µg/L	SW-11	1/5	0.21–0.62	1.2	N/A	1.8	N			no	BSL
7440-70-2	Calcium	54000		55600		µg/L	SW-09	2/2	–	55600	N/A	N/A				no	NUT
7440-47-3	Chromium	1.7		6.2		µg/L	SW-11	3/5	1.2–1.2	6.2	N/A	11	N[b]			no	BSL
7440-48-4	Cobalt	–		–		µg/L		0/2	1–1.4	ND	N/A	220	N			no	IFD
7440-50-8	Copper	2.4		3.2		µg/L	SW-08	2/5	5.9–13	3.2	N/A	140	N			no	BSL
7439-89-6	Iron	653		2620		µg/L	SW-11	5/5	–	2620	N/A	1100	N			**YES**	ASL
7439-92-1	Lead	2		19		µg/L	SW-11	5/5	–	19	N/A	15	MCL			**YES**	ASL[c]
7439-95-4	Magnesium	66200		67500		µg/L	SW-09	2/2	–	67500	N/A	N/A				no	NUT
7439-96-5	Manganese	141		413		µg/L	SW-10	5/5	–	413	N/A	88	N			**YES**	ASL
7439-97-6	Mercury (total)	402		17600		ng/L	SW-08	5/5	–	17600	N/A	1100	N			**YES**	ASL
16056-34-1	Methyl mercury	1.14		2.77		ng/L	SW-12	5/5	–	2.77	N/A	360	N			no	BSL
7440-02-0	Nickel	1.7		3.6		µg/L	SW-10	3/5	4–4.4	3.6	N/A	73	N			no	BSL
7440-09-7	Potassium	27600	J	28000	J	µg/L	SW-09	2/2	–	28000	N/A	N/A				no	NUT
7782-49-2	Selenium	–		–		µg/L		0/5	2.4–3.8	ND	N/A	18	N			no	IFD
7440-22-4	Silver	–		–		µg/L		0/5	0.67–1.8	ND	N/A	18	N			no	IFD
7440-23-5	Sodium	396000	J	438000	J	µg/L	SW-09	2/2	–	438000	N/A	N/A				no	NUT
7440-28-0	Thallium	–		–		µg/L		0/5	4.4–6.4	ND	N/A	0.24	N			no	IFD
7440-62-2	Vanadium	2.6		3		µg/L	SW-08	2/2	–	3	N/A	26	N			no	BSL
7440-66-6	Zinc	35.9	J	403		µg/L	SW-11	4/5	54.1–54.1	403	N/A	1100	N			no	BSL
	ORGANICS																
	Petroleum hydrocarbons	–		–		mg/L		0/2	0.5–0.5	ND		N/A				no	IFD
120-82-1	1,2,4-Trichlorobenzene	–		–		µg/L		0/2	10–10	ND		190	N			no	IFD
95-50-1	1,2-Dichlorobenzene	–		–		µg/L		0/2	10–10	ND		37	N			no	IFD
541-73-1	1,3-Dichlorobenzene	–		–		µg/L		0/2	10–10	ND		0.55	N			no	IFD
106-46-7	1,4-Dichlorobenzene	–		–		µg/L		0/2	10–10	ND		0.5	C			no	IFD
108-60-1	2,2'-Oxybis[1-chloropropane]	–		–		µg/L		0/2	10–10	ND		0.27	N			no	IFD
95-95-4	2,4,5-Trichlorophenol	–		–		µg/L		0/2	25–25	ND		360	N			no	IFD
88-06-2	2,4,6-Trichlorophenol	–		–		µg/L		0/2	10–10	ND		6.1	N			no	IFD
120-83-2	2,4-Dichlorophenol	–		–		µg/L		0/2	10–10	ND		11	N			no	IFD
105-67-9	2,4-Dimethylphenol	–		–		µg/L		0/2	10–10	ND		73	N			no	IFD
51-28-5	2,4-Dinitrophenol	–		–		µg/L		0/2	10–25	ND		7.3	N			no	IFD
121-14-2	2,4-Dinitrotoluene	–		–		µg/L		0/2	10–10	ND		7.3	N			no	IFD

Table A-4. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
606-20-2	2,6-Dinitrotoluene	–		–		µg/L		0/2	10–10	ND		3.6	N			no	IFD
91-58-7	2-Chloronaphthalene	–		–		µg/L		0/2	10–10	ND		49	N			no	IFD
95-57-8	2-Chlorophenol	–		–		µg/L		0/2	10–10	ND		3	N			no	IFD
534-52-1	2-Methyl-4,6-dinitrophenol	–		–		µg/L		0/2	25–25	ND		N/A				no	IFD
95-48-7	2-Methylphenol	–		–		µg/L		0/2	10–10	ND		180	N			no	IFD
88-74-4	2-Nitroaniline	–		–		µg/L		0/2	25–25	ND		0.21	N			no	IFD
88-75-5	2-Nitrophenol	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD
91-94-1	3,3'-Dichlorobenzidine	–		–		µg/L		0/2	10–10	ND		0.15	C			no	IFD
99-09-2	3-Nitroaniline	–		–		µg/L		0/2	25–25	ND		N/A				no	IFD
101-55-3	4-Bromophenyl-phenyl ether	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD
59-50-7	4-Chloro-3-methylphenol	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD
106-47-8	4-Chloroaniline	–		–		µg/L		0/2	10–10	ND		15	N			no	IFD
7005-72-3	4-Chlorophenyl-phenyl ether	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD
106-44-5	4-Methylphenol	–		–		µg/L		0/2	10–10	ND		18	N			no	IFD
100-01-6	4-Nitroaniline	–		–		µg/L		0/2	25–25	ND		N/A				no	IFD
100-02-7	4-Nitrophenol	–		–		µg/L		0/2	25–25	ND		29	N			no	IFD
111-91-1	bis[2-chloroethoxy]methane	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD
111-44-4	bis[2-chloroethyl]ether	–		–		µg/L		0/2	10–10	ND		0.0098	C			no	IFD
117-81-7	bis[2-Ethylhexyl]phthalate	–		–		µg/L		0/2	10–10	ND		4.8	C			no	IFD
85-68-7	Butylbenzyl phthalate	–		–		µg/L		0/2	10–10	ND		730	N			no	IFD
86-74-8	Carbazole	–		–		µg/L		0/2	10–10	ND		3.4	C			no	IFD
132-64-9	Dibenzofuran	–		–		µg/L		0/2	10–10	ND		2.4	N			no	IFD
84-66-2	Diethyl phthalate	–		–		µg/L		0/2	10–10	ND		2900	N			no	IFD
131-11-3	Dimethyl phthalate	–		–		µg/L		0/2	10–10	ND		36000	N			no	IFD
84-74-2	Di-n-butyl phthalate	–		–		µg/L		0/2	10–10	ND		360	N			no	IFD
117-84-0	Di-n-octyl phthalate	–		–		µg/L		0/2	10–10	ND		73	C			no	IFD
118-74-1	Hexachlorobenzene	–		–		µg/L		0/2	10–10	ND		0.042	C			no	IFD
87-68-3	Hexachlorobutadiene	–		–		µg/L		0/2	10–10	ND		0.86	C			no	IFD
77-47-4	Hexachlorocyclopentadiene	–		–		µg/L		0/2	10–10	ND		26	N			no	IFD
67-72-1	Hexachloroethane	–		–		µg/L		0/2	10–10	ND		3.6	N			no	IFD
78-59-1	Isophorone	–		–		µg/L		0/2	10–10	ND		71	C			no	IFD
98-95-3	Nitrobenzene	–		–		µg/L		0/2	10–10	ND		0.34	N			no	IFD
621-64-7	N-nitroso-di-n-propylamine	–		–		µg/L		0/2	10–10	ND		0.0096	C			no	IFD
86-30-6	N-nitrosodiphenylamine	–		–		µg/L		0/2	10–10	ND		14	C			no	IFD
87-86-5	Pentachlorophenol	–		–		µg/L		0/2	25–25	ND		0.56	C			no	IFD
108-95-2	Phenol	–		–		µg/L		0/2	10–10	ND		2200	N			no	IFD
71-55-6	1,1,1-Trichloroethane	–		–		µg/L		0/2	10–10	ND		54	N			no	IFD
79-34-5	1,1,2,2-Tetrachloroethane	–		–		µg/L		0/2	10–10	ND		0.055	N			no	IFD
79-00-5	1,1,2-Trichloroethane	–		–		µg/L		0/2	10–10	ND		0.2	N			no	IFD
75-34-3	1,1-Dichloroethane	–		–		µg/L		0/2	10–10	ND		81	N			no	IFD
75-35-4	1,1-Dichloroethene	–		–		µg/L		0/2	10–10	ND		0.046	C			no	IFD
107-06-2	1,2-Dichloroethane	–		–		µg/L		0/2	10–10	ND		0.12	C			no	IFD
540-59-0	1,2-Dichloroethene isomers (total)	–		–		µg/L		0/2	10–10	ND		N/A				no	IFD

Table A-4. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
78-87-5	1,2-Dichloropropane	–		–		µg/L		0/2	10–10	ND		0.16 C			no	IFD
78-93-3	2-Butanone	–		–		µg/L		0/2	10–10	ND		190 N			no	IFD
591-78-6	2-Hexanone	–		–		µg/L		0/2	10–10	ND		N/A			no	IFD
108-10-1	4-Methyl-2-pentanone	–		–		µg/L		0/2	10–10	ND		16 N			no	IFD
67-64-1	Acetone	–		–		µg/L		0/2	10–10	ND		61 N			no	IFD
71-43-2	Benzene	–		–		µg/L		0/2	10–10	ND		0.35 C			no	IFD
75-27-4	Bromodichloromethane	–		–		µg/L		0/2	10–10	ND		0.18 C			no	IFD
75-25-2	Bromoform	–		–		µg/L		0/2	10–10	ND		8.5 C			no	IFD
74-83-9	Bromomethane	–		–		µg/L		0/2	10–10	ND		0.87 N			no	IFD
75-15-0	Carbon disulfide	–		–		µg/L		0/2	10–10	ND		100 N			no	IFD
56-23-5	Carbon tetrachloride	–		–		µg/L		0/2	10–10	ND		0.17 C			no	IFD
108-90-7	Chlorobenzene	–		–		µg/L		0/2	10–10	ND		11 N			no	IFD
75-00-3	Chloroethane	–		–		µg/L		0/2	10–10	ND		4.6 C			no	IFD
67-66-3	Chloroform	–		–		µg/L		0/2	10–10	ND		0.063 N			no	IFD
74-87-3	Chloromethane	–		–		µg/L		0/2	10–10	ND		1.5 C			no	IFD
10061-01-5	cis-1,3-Dichloropropene	–		–		µg/L		0/2	10–10	ND		0.4 C			no	IFD
124-48-1	Dibromochloromethane	–		–		µg/L		0/2	10–10	ND		0.13 C			no	IFD
100-41-4	Ethylbenzene	–		–		µg/L		0/2	10–10	ND		130 N			no	IFD
75-09-2	Methylene chloride	–		–		µg/L		0/2	10–10	ND		4.3 C			no	IFD
100-42-5	Styrene	–		–		µg/L		0/2	10–10	ND		160 N			no	IFD
127-18-4	Tetrachloroethene	–		–		µg/L		0/2	10–10	ND		1.1 N			no	IFD
108-88-3	Toluene	–		–		µg/L		0/2	10–10	ND		72 N			no	IFD
10061-02-6	trans-1,3-Dichloropropene	–		–		µg/L		0/2	10–10	ND		0.4 C			no	IFD
79-01-6	Trichloroethene	–		–		µg/L		0/2	10–10	ND		1.6 N			no	IFD
75-01-4	Vinyl chloride	–		–		µg/L		0/2	10–10	ND		0.041 C			no	IFD
1330-20-7	Xylene isomers (total)	–		–		µg/L		0/2	10–10	ND		140 N			no	IFD
	PAHS															
91-57-6	2-Methylnaphthalene	–		–		µg/L		0/2	10–10	ND		0.62 N[d]			no	IFD
83-32-9	Acenaphthene	–		–		µg/L		0/2	10–10	ND		37 N			no	IFD
208-96-8	Acenaphthylene	–		–		µg/L		0/2	10–10	ND		0.62 N[d]			no	IFD
120-12-7	Anthracene	–		–		µg/L		0/2	10–10	ND		180 N			no	IFD
56-55-3	Benz[a]anthracene	–		–		µg/L		0/2	10–10	ND		0.092 C			no	IFD
50-32-8	Benzo[a]pyrene	–		–		µg/L		0/2	10–10	ND		0.0092 C			no	IFD
205-99-2	Benzo[b]fluoranthene	–		–		µg/L		0/2	10–10	ND		0.092 C			no	IFD
191-24-2	Benzo[ghi]perylene	–		–		µg/L		0/2	10–10	ND		0.62 N[d]			no	IFD
207-08-9	Benzo[k]fluoranthene	–		–		µg/L		0/2	10–10	ND		0.92 C			no	IFD
218-01-9	Chrysene	–		–		µg/L		0/2	10–10	ND		9.2 C			no	IFD
53-70-3	Dibenz[a,h]anthracene	–		–		µg/L		0/2	10–10	ND		0.0092 N			no	IFD
206-44-0	Fluoranthene	–		–		µg/L		0/2	10–10	ND		150 N			no	IFD
86-73-7	Fluorene	–		–		µg/L		0/2	10–10	ND		24 N			no	IFD
193-39-5	Indeno[1,2,3-cd]pyrene	–		–		µg/L		0/2	10–10	ND		0.092 C			no	IFD
91-20-3	Naphthalene	–		–		µg/L		0/2	10–10	ND		0.62 N			no	IFD
85-01-8	Phenanthrene	–		–		µg/L		0/2	10–10	ND		0.62 N[d]			no	IFD

Table A-4. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Registry Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
129-00-0	Pyrene	–		–		µg/L		0/2	10–10	ND		18 N			no	IFD

Notes: All results reported as unfiltered.
For the purposes of screening, field replicates have been averaged.

– - either no detected or undetected values
C - carcinogenic based on a cancer risk of 1 X 10^{-6}
CoPC - chemical of potential concern
J - estimated value
MCL - maximum contaminant level
N - noncarcinogenic based on hazard quotient of 0.1
N/A - not applicable
ND - not detected

Rationale Codes:

Selection Reason:
ASL - above screening levels
HIST - infrequent detection but associated historically

Deletion Reason:
BKG - below or consistent with background levels
BSL - below screening level
IFD - infrequent detection
NTX - no toxicity information
NUT - essential nutrient

[a] Screening toxicity values for surface water are the tap water PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.
[b] This default carcinogenic screening value for chromium is that for chromium IV.
[c] Lead has been evaluated qualitatively.
[d] This default screening value is that for naphthalene, the noncarcinogenic PAH with the most stringent RBC/PRG.

Table A-5. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

Scenario Timeframe:	Current/Future
Medium:	Water
Exposure Medium:	Groundwater
Exposure Point:	Groundwater sitewide

CAS Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
	INORGANICS																
7429-90-5	Aluminum	65.3		120		µg/L	MW-6	2/12	28.1–282	120	N/A	3600	N			No	BSL
7440-36-0	Antimony	–		–		µg/L	–	0/12	3.4–3.4	ND	N/A	1.5	N			No	IFD
7440-38-2	Arsenic	2.6		21.4	J	µg/L	MW-13	5/27	2.4–5.5	21.4	N/A	0.045	C			**Yes**	ASL
7440-39-3	Barium	22.7		934		µg/L	MW-2	27/27	–	934	N/A	260	N			**Yes**	ASL
7440-41-7	Beryllium	0.52		0.61		µg/L	MW-4	2/12	0.25–0.85	0.61	N/A	7.3	N			No	BSL
7440-43-9	Cadmium	0.89		5.7		µg/L	MW-5	13/27	0.21–0.62	5.7	N/A	1.8	N			**Yes**	ASL
7440-70-2	Calcium	49900		568000		µg/L	MW-3	12/12	–	568000	N/A	N/A				No	NUT
7440-47-3	Chromium	0.27		9.7		µg/L	MW-1	15/27	0.22–1.4	9.7	N/A	11	N[b]			No	BSL
7440-48-4	Cobalt	0.94		3.9		µg/L	MW-6	10/12	0.88–0.88	3.9	N/A	220	N			No	BSL
7440-50-8	Copper	1.7		356		µg/L	MW-15	10/27	1.5–15	356	N/A	140	N			**Yes**	ASL
7439-89-6	Iron	152		37500		µg/L	MW-8	25/27	71.8–77.3	37500	N/A	1100	N			**Yes**	ASL
7439-92-1	Lead	1		13.9		µg/L	MW-15	9/27	0.99–5.2	13.9	N/A	15	MCL			No	BSL
7439-95-4	Magnesium	8130		87500		µg/L	MW-6	12/12	–	87500	N/A	N/A				No	NUT
7439-96-5	Manganese	7.2		6580		µg/L	MW-14	27/27	–	6580	N/A	88	N			**Yes**	ASL
7439-97-6	Mercury (total)	0.01084		54.243		µg/L	MW-15	23/30	200–200	54.243	N/A	1.1	N			**Yes**	ASL
16056-34-1	Methyl mercury	0.00012		0.03273		µg/L	MW-3	27/27	–	0.03273	N/A	0.36	N			No	BSL
7440-02-0	Nickel	2		115	J	µg/L	MW-6	20/27	1.1–14.5	115	N/A	73	N			**Yes**	ASL
7440-09-7	Potassium	1140	J	32800	J	µg/L	MW-2	12/12	–	32800	N/A	N/A				No	NUT
7782-49-2	Selenium	2.94	J	13.4		µg/L	MW-3	6/27	2.4–3.8	13.4	N/A	18	N			No	BSL
7440-22-4	Silver	–		–		µg/L	–	0/27	0.67–1.84	ND	N/A	18	N			No	IFD
7440-23-5	Sodium	31700		484000	J	µg/L	MW-6	12/12	–	484000	N/A	N/A				No	NUT
7440-28-0	Thallium	5		13.5		µg/L	MW-2	4/27	3.8–10.3	13.5	N/A	0.24	C			**Yes**	ASL
7440-62-2	Vanadium	2.3		50.7		µg/L	MW-12	10/12	1.6–1.6	50.7	N/A	26	N			**Yes**	ASL
7440-66-6	Zinc	12.5		803		µg/L	MW-7	19/27	9.6–17.8	803	N/A	1100	N			No	BSL
	ORGANICS																
	Petroleum hydrocarbons	0.5		3.6		mg/L	MW-2	2/27	0.5–0.5	3.6		N/A				No	NTX
120-82-1	1,2,4-Trichlorobenzene	–		–		µg/L	–	0/13	10–400	ND		190	C			No	IFD
95-50-1	1,2-Dichlorobenzene	1		1		µg/L	MW-5	1/13	10–400	1		37	N			No	BSL
541-73-1	1,3-Dichlorobenzene	–		–		µg/L	–	0/13	10–400	ND		0.55	N			No	IFD
106-46-7	1,4-Dichlorobenzene	3		4		µg/L	MW-1	2/13	10–400	4		0.5	C			**Yes**	ASL
108-60-1	2,2'-Oxybis[1-chloropropane]	–		–		µg/L	–	0/13	10–400	ND		0.27	C			No	IFD
95-95-4	2,4,5-Trichlorophenol	–		–		µg/L	–	0/13	10–1000	ND		360	N			No	IFD
88-06-2	2,4,6-Trichlorophenol	–		–		µg/L	–	0/13	10–400	ND		6.1	N			No	IFD
120-83-2	2,4-Dichlorophenol	–		–		µg/L	–	0/13	10–400	ND		11	N			No	IFD
105-67-9	2,4-Dimethylphenol	–		–		µg/L	–	0/13	10–400	ND		73	N			No	IFD
51-28-5	2,4-Dinitrophenol	–		–		µg/L	–	0/13	25–1000	ND		7.3	N			No	IFD
121-14-2	2,4-Dinitrotoluene	–		–		µg/L	–	0/13	10–400	ND		7.3	N			No	IFD
606-20-2	2,6-Dinitrotoluene	–		–		µg/L	–	0/13	10–400	ND		3.6	N			No	IFD
91-58-7	2-Chloronaphthalene	–		–		µg/L	–	0/13	10–400	ND		49	N			No	IFD
95-57-8	2-Chlorophenol	–		–		µg/L	–	0/13	10–400	ND		3	N			No	IFD

Table A-5. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
534-52-1	2-Methyl-4,6-dinitrophenol	–		–		µg/L	–	0/13	25–1000	ND		N/A				No	IFD
95-48-7	2-Methylphenol	–		–		µg/L	–	0/13	10–400	ND		180	N			No	IFD
88-74-4	2-Nitroaniline	–		–		µg/L	–	0/13	25–1000	ND		0.21	N			No	IFD
88-75-5	2-Nitrophenol	–		–		µg/L	–	0/13	10–400	ND		N/A				No	IFD
91-94-1	3,3'-Dichlorobenzidine	–		–		µg/L	–	0/13	10–400	ND		0.15	C			No	IFD
99-09-2	3-Nitroaniline	–		–		µg/L	–	0/13	25–1000	ND		N/A				No	IFD
101-55-3	4-Bromophenyl-phenyl ether	–		–		µg/L	–	0/13	10–400	ND		N/A				No	IFD
59-50-7	4-Chloro-3-methylphenol	–		–		µg/L	–	0/13	10–400	ND		N/A				No	IFD
106-47-8	4-Chloroaniline	–		–		µg/L	–	0/13	10–400	ND		15	N			No	IFD
7005-72-3	4-Chlorophenyl-phenyl ether	–		–		µg/L	–	0/13	10–400	ND		N/A				No	IFD
106-44-5	4-Methylphenol	2		62		µg/L	MW-2	2/13	10–10	62		18	N			Yes	ASL
100-01-6	4-Nitroaniline	–		–		µg/L	–	0/13	25–1000	ND		N/A				No	IFD
100-02-7	4-Nitrophenol	–		–		µg/L	–	0/13	25–1000	ND		29	N			No	IFD
100-51-6	Benzyl alcohol	–		–		µg/L	–	0/1	10–10	ND		1100	N			No	IFD
111-91-1	bis[2-chloroethoxy]methane	–		–		µg/L	–	0/13	10–400	ND		N/A				No	IFD
111-44-4	bis[2-chloroethyl]ether	–		–		µg/L	–	0/13	10–400	ND		0.01	C			No	IFD
117-81-7	bis[2-Ethylhexyl]phthalate	6		6		µg/L	MW-6	1/13	10–400	6		4.8	C			Yes	ASL
85-68-7	Butylbenzyl phthalate	–		–		µg/L	–	0/13	10–400	ND		730	N			No	IFD
86-74-8	Carbazole	–		–		µg/L	–	0/13	10–400	ND		3.4	C			No	IFD
132-64-9	Dibenzofuran	–		–		µg/L	–	0/13	10–400	ND		2.4	N			No	IFD
84-66-2	Diethyl phthalate	–		–		µg/L	–	0/13	10–400	ND		2900	N			No	IFD
131-11-3	Dimethyl phthalate	–		–		µg/L	–	0/13	10–400	ND		36000	N			No	IFD
84-74-2	Di-n-butyl phthalate	–		–		µg/L	–	0/13	10–400	ND		360	N			No	IFD
117-84-0	Di-n-octyl phthalate	–		–		µg/L	–	0/13	10–400	ND		73	N			No	IFD
118-74-1	Hexachlorobenzene	–		–		µg/L	–	0/13	10–400	ND		0.042	C			No	IFD
87-68-3	Hexachlorobutadiene	–		–		µg/L	–	0/13	10–400	ND		0.86	C			No	IFD
77-47-4	Hexachlorocyclopentadiene	–		–		µg/L	–	0/13	10–400	ND		26	N			No	IFD
67-72-1	Hexachloroethane	–		–		µg/L	–	0/13	10–400	ND		3.6	N			No	IFD
78-59-1	Isophorone	–		–		µg/L	–	0/13	10–400	ND		71	C			No	IFD
98-95-3	Nitrobenzene	–		–		µg/L	–	0/13	10–400	ND		0.34	N			No	IFD
62-75-9	N-nitroso dimethylamine	–		–		µg/L	–	0/1	10–10	ND		0.001	C			No	IFD
621-64-7	N-nitroso-di-n-propylamine	–		–		µg/L	–	0/13	10–400	ND		0.01	C			No	IFD
86-30-6	N-nitrosodiphenylamine	–		–		µg/L	–	0/13	10–400	ND		14	C			No	IFD
87-86-5	Pentachlorophenol	–		–		µg/L	–	0/13	10–1000	ND		0.56	C			No	IFD
108-95-2	Phenol	–		–		µg/L	–	0/13	10–400	ND		2200	N			No	IFD
71-55-6	1,1,1-Trichloroethane	–		–		µg/L	–	0/12	10–10	ND		54	N			No	IFD
79-34-5	1,1,2,2-Tetrachloroethane	–		–		µg/L	–	0/12	10–25	ND		0.055	C			No	IFD
79-00-5	1,1,2-Trichloroethane	–		–		µg/L	–	0/12	10–10	ND		0.20	C			No	IFD
75-34-3	1,1-Dichloroethane	–		–		µg/L	–	0/12	10–10	ND		81	N			No	IFD
75-35-4	1,1-Dichloroethene	–		–		µg/L	–	0/12	10–10	ND		0.046	C			No	IFD
107-06-2	1,2-Dichloroethane	–		–		µg/L	–	0/12	10–10	ND		0.12	C			No	IFD
540-59-0	1,2-Dichloroethene isomers (tc	2		45		µg/L	MW-9	2/12	10–10	45		0.46	C			Yes	ASL
78-87-5	1,2-Dichloropropane	–		–		µg/L	–	0/12	10–10	ND		0.16	C			No	IFD
78-93-3	2-Butanone	26	J	26	J	µg/L	MW-4	1/12	10–10	26		190	N			No	BSL
591-78-6	2-Hexanone	–		–		µg/L	–	0/12	10–10	ND		N/A				No	IFD
108-10-1	4-Methyl-2-pentanone	31		31		µg/L	MW-2	1/12	10–10	31		16	N			Yes	ASL

Table A-5. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection
67-64-1	Acetone	100	J	100	J	µg/L	MW-3	1/12	10–150	100		61	N			**Yes**	ASL
71-43-2	Benzene	1.2		140		µg/L	MW-2	8/27	1–10	140		0.35	C			**Yes**	ASL
75-27-4	Bromodichloromethane	–		–		µg/L	–	0/12	10–10	ND		0.18	C			No	IFD
75-25-2	Bromoform	–		–		µg/L	–	0/12	10–10	ND		8.5	C			No	IFD
74-83-9	Bromomethane	–		–		µg/L	–	0/12	10–10	ND		0.87	N			No	IFD
75-15-0	Carbon disulfide	16		16		µg/L	MW-7	1/12	10–10	16		100	N			No	BSL
56-23-5	Carbon tetrachloride	–		–		µg/L	–	0/12	10–10	ND		0.17	C			No	IFD
108-90-7	Chlorobenzene	1.9		28		µg/L	MW-1	8/27	4–10	28		11	N			**Yes**	ASL
75-00-3	Chloroethane	20	J	20	J	µg/L	MW-7	1/12	10–10	20		4.6	C			**Yes**	ASL
67-66-3	Chloroform	–		–		µg/L	–	0/12	10–10	ND		0.063	N			No	IFD
74-87-3	Chloromethane	–		–		µg/L	–	0/12	10–10	ND		1.5	C			No	IFD
10061-01-5	cis-1,3-Dichloropropene	–		–		µg/L	–	0/12	10–10	ND		0.4	C			No	IFD
124-48-1	Dibromochloromethane	–		–		µg/L	–	0/12	10–10	ND		0.13	C			No	IFD
100-41-4	Ethylbenzene	120		120		µg/L	MW-2	1/12	10–10	120		130	N			No	BSL
136777-61-2	meta & para Xylenes	51		51		µg/L	MW-2	1/15	5–5	51		140	N			No	BSL
75-09-2	Methylene chloride	–		–		µg/L	–	0/12	10–10	ND		4.3	C			No	IFD
95-47-6	ortho-Xylene	22		22		µg/L	MW-2	1/15	5–5	22		140	N			No	BSL
100-42-5	Styrene	–		–		µg/L	–	0/12	10–10	ND		160	N			No	IFD
127-18-4	Tetrachloroethene	–		–		µg/L	–	0/12	10–10	ND		1.1	C			No	IFD
108-88-3	Toluene	330		1700		µg/L	MW-2	2/27	5–10	1700		72	N			**Yes**	ASL
10061-02-6	trans-1,3-Dichloropropene	–		–		µg/L	–	0/12	10–10	ND		0.4	C			No	IFD
79-01-6	Trichloroethene	–		–		µg/L	–	0/12	10–10	ND		1.6	C			No	IFD
75-01-4	Vinyl chloride	–		–		µg/L	–	0/12	10–10	ND		0.041	C			No	IFD
1330-20-7	Xylene isomers (total)	390		390		µg/L	MW-2	1/12	10–10	390		140	N			**Yes**	ASL
	PAHS																
91-57-6	2-Methylnaphthalene	1		1		µg/L	MW-1	2/13	10–400	1		0.62	N[c]			**Yes**	ASL
83-32-9	Acenaphthene	2		2		µg/L	MW-1	1/13	10–400	2		37	N			No	BSL
208-96-8	Acenaphthylene	–		–		µg/L	–	0/13	10–400	ND		0.62	N[c]			No	IFD
120-12-7	Anthracene	–		–		µg/L	–	0/13	10–400	ND		180	N			No	IFD
56-55-3	Benz[a]anthracene	–		–		µg/L	–	0/13	10–400	ND		0.092	C			No	IFD
50-32-8	Benzo[a]pyrene	–		–		µg/L	–	0/13	10–400	ND		0.009	C			No	IFD
205-99-2	Benzo[b]fluoranthene	–		–		µg/L	–	0/13	10–400	ND		0.092	C			No	IFD
191-24-2	Benzo[ghi]perylene	–		–		µg/L	–	0/13	10–400	ND		0.62	N[c]			No	IFD
207-08-9	Benzo[k]fluoranthene	–		–		µg/L	–	0/13	10–400	ND		0.92	C			No	IFD
218-01-9	Chrysene	–		–		µg/L	–	0/13	10–400	ND		9.2	C			No	IFD
53-70-3	Dibenz[a,h]anthracene	–		–		µg/L	–	0/13	10–400	ND		0.009	C			No	IFD
206-44-0	Fluoranthene	–		–		µg/L	–	0/13	10–400	ND		150	N			No	IFD
86-73-7	Fluorene	–		–		µg/L	–	0/13	10–400	ND		24	N			No	IFD
193-39-5	Indeno[1,2,3-cd]pyrene	–		–		µg/L	–	0/13	10–400	ND		0.092	C			No	IFD
91-20-3	Naphthalene	9		100		µg/L	MW-2	2/13	10–10	100		0.62	N			**Yes**	ASL
85-01-8	Phenanthrene	–		–		µg/L	–	0/13	10–400	ND		0.62	N[c]			No	IFD
129-00-0	Pyrene	–		–		µg/L	–	0/13	10–400	ND		18	N			No	IFD

Table A-5. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

CAS Number	Analyte	Minimum detected value	Q	Maximum detected value	Q	Concen-tration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concen-tration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Substance Deletion or Selection

Notes: All results reported as unfiltered.
For the purposes of screening, field replicates have been averaged.

- – - either no detected or undetected values
- C - carcinogenic based on a cancer risk of 1 X 10^{-6}
- CoPC - chemical of potential concern
- J - estimated value
- MCL - maximum contaminant level
- N - noncarcinogenic based on hazard quotient of 0.1
- N/A - not applicable
- ND - not detected

Rationale Codes:

Selection Reason:
- ASL - above screening levels
- HIST - infrequent detection but associated historically

Deletion Reason:
- BKG - below or consistent with background levels
- BSL - below screening level
- IFD - infrequent detection
- NTX - no toxicity information
- NUT - essential nutrient

[a] Screening toxicity values for groundwater are the tap water PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.
[b] This default carcinogenic screening value for chromium is that for chromium IV.
[c] This default screening value is that for naphthalene, the noncarcinogenic PAH with the most stringent RBC/PRG.

Table A-6. Occurrence, distribution and selection of chemicals of potential concern
Wood-Ridge

Scenario Timeframe	Current/Future
Medium:	Soil
Exposure Medium:	Air
Exposure Point:	Outdoor air

CAS Registry Number	Analyte	Minimum detected value	Maximum detected value	Concentration units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Values[a]	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	CoPC Flag	Rationale for Contaminant Deletion or Selection
INDOOR AIR														
	Mercury Vapor	10.95	30.4	ng/m³	A1	5/5	–	30.4	N/A	31 N			No	BSL
OUTDOOR AIR														
	Mercury Vapor	1.42	60.6	ng/m³	A4	11/11	–	60.6	N/A	31 N			**Yes**	ASL

Notes: All results reported as dry weight.

– - no undetected value
C - carcinogenic based on a cancer risk of 1 X 10^{-6}
CoPC - chemical of potential concern
N - noncarcinogenic based on hazard quotient of 0.1
N/A - not applicable

Rationale Codes:

Selection Reason:
ASL - above screening levels
HIST - infrequent detection but associated historically

Deletion Reason:
BKG - below or consistent with background levels
BSL - below screening level
IFD - infrequent detection
NTX - no toxicity information
NUT - essential nutrient

[a] Screening toxicity values for air are the ambient air PRGs taken from U.S. EPA Region IX (2000b). PRGs correspond to 1 X 10^{-6} or a hazard quotient of 0.1, whichever is lower.

Table A-7. Medium-specific exposure point concentration summary
Wood-Ridge Site

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Surface soil
Exposure Point:	Developed Area surface soil

							Reasonable Maximum Exposure			Central Tendency		
Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Current												
Aluminum	mg/kg	8.1E+03	n<10	1.2E+04		mg/kg	1.2E+04	Max	n<10	1.2E+04	Max	n<10
Arsenic	mg/kg	5.7E+00	n<10	1.1E+01		mg/kg	1.1E+01	Max	n<10	1.1E+01	Max	n<10
Chromium	mg/kg	4.3E+01	n<10	9.7E+01	J	mg/kg	9.7E+01	Max	n<10	9.7E+01	Max	n<10
Copper	mg/kg	1.9E+02	n<10	4.7E+02	J	mg/kg	4.7E+02	Max	n<10	4.7E+02	Max	n<10
Iron	mg/kg	1.5E+04	n<10	2.3E+04		mg/kg	2.3E+04	Max	n<10	2.3E+04	Max	n<10
Lead	mg/kg	2.1E+02	n<10	3.9E+02		mg/kg	3.9E+02	Max	n<10	3.9E+02	Max	n<10
Manganese	mg/kg	3.6E+02	n<10	5.4E+02	J	mg/kg	5.4E+02	Max	n<10	5.4E+02	Max	n<10
Mercury (total)	mg/kg	1.2E+02	n<10	3.1E+02		mg/kg	3.1E+02	Max	n<10	3.1E+02	Max	n<10
Vanadium	mg/kg	6.7E+01	n<10	1.4E+02		mg/kg	1.4E+02	Max	n<10	1.4E+02	Max	n<10
Benz[a]anthracene	mg/kg	2.3E-01	n<10	3.1E-01		mg/kg	3.1E-01	Max	n<10	3.1E-01	Max	n<10
Benzo[a]pyrene	mg/kg	2.7E-01	n<10	4.1E-01		mg/kg	4.1E-01	Max	n<10	4.1E-01	Max	n<10
Benzo[b]fluoranthene	mg/kg	3.4E-01	n<10	7.5E-01		mg/kg	7.5E-01	Max	n<10	7.5E-01	Max	n<10
Dibenz[a,h]anthracene	mg/kg	1.5E-01	n<10	7.1E-02		mg/kg	7.1E-02	Max	n<10	7.1E-02	Max	n<10
Future												
Aluminum	mg/kg	6.5E+03	n<10	1.2E+04		mg/kg	1.2E+04	Max	n<10	1.2E+04	Max	n<10
Arsenic	mg/kg	4.3E+00	1.3E+01	1.1E+01		mg/kg	1.1E+01	Max	KS-Test (2)	1.1E+01	Max	KS-Test (2)
Copper	mg/kg	6.5E+02	2.2E+03	7.4E+03		mg/kg	2.2E+03	95% UCL-T	KS-Test (1)	2.2E+03	95% UCL-T	KS-Test (1)
Chromium	mg/kg	2.3E+01	n<10	9.7E+01	J	mg/kg	9.7E+01	Max	n<10	9.7E+01	Max	n<10
Iron	mg/kg	1.3E+04	2.2E+04	2.4E+04		mg/kg	2.2E+04	95% UCL-T	KS-Test (1)	2.2E+04	95% UCL-T	KS-Test (1)
Lead	mg/kg	1.1E+02	2.6E+02	3.9E+02		mg/kg	2.6E+02	95% UCL-T	KS-Test (1)	2.6E+02	95% UCL-T	KS-Test (1)
Manganese	mg/kg	2.6E+02	4.0E+02	5.4E+02	J	mg/kg	4.0E+02	95% UCL-T	KS-Test (1)	4.0E+02	95% UCL-T	KS-Test (1)
Mercury (total)	mg/kg	6.9E+02	5.9E+03	2.3E+03		mg/kg	2.3E+03	Max	KS-Test (2)	2.3E+03	Max	KS-Test (2)
Thallium	mg/kg	1.2E+00	1.8E+00	5.4E+00		mg/kg	1.8E+00	95% UCL-T	KS-Test (1)	1.8E+00	95% UCL-T	KS-Test (1)
Vanadium	mg/kg	3.7E+01	n<10	1.4E+02		mg/kg	1.4E+02	Max	n<10	1.4E+02	Max	n<10
Benz[a]anthracene	mg/kg	5.0E-01	8.5E-01	1.4E+00		mg/kg	8.5E-01	95% UCL-T	KS-Test (1)	8.5E-01	95% UCL-T	KS-Test (1)
Benzo[a]pyrene	mg/kg	4.3E-01	6.8E-01	1.1E+00		mg/kg	6.8E-01	95% UCL-T	KS-Test (1)	6.8E-01	95% UCL-T	KS-Test (1)
Benzo[b]fluoranthene	mg/kg	5.3E-01	1.1E+00	1.4E+00		mg/kg	1.1E+00	95% UCL-T	KS-Test (1)	1.1E+00	95% UCL-T	KS-Test (1)
Dibenz[a,h]anthracene	mg/kg	1.2E-01	1.7E-01	1.5E-01		mg/kg	1.5E-01	Max	KS-Test (2)	1.5E-01	Max	KS-Test (2)
Benzene	mg/kg	2.9E-01	2.8E+00	2.8E+00	J	mg/kg	2.8E+00	95% UCL-T	KS-Test (1)	2.8E+00	95% UCL-T	KS-Test (1)

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-8. Medium-specific exposure point concentration summary
Wood-Ridge Site

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Soil/sediment
Exposure Medium:	Surface soil/sediment
Exposure Point:	Undeveloped Area surface soil/sediment

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Soils												
Aluminum	mg/kg	6.2E+03	7.0E+03	1.1E+04		mg/kg	7.0E+03	95% UCL-T	KS-Test (1)	7.0E+03	95% UCL-T	KS-Test (1)
Antimony	mg/kg	5.5E+00	1.1E+01	5.4E+01		mg/kg	1.1E+01	95% UCL-T	KS-Test (1)	1.1E+01	95% UCL-T	KS-Test (1)
Arsenic	mg/kg	7.8E+00	1.3E+01	2.6E+01		mg/kg	1.3E+01	95% UCL-T	KS-Test (1)	1.3E+01	95% UCL-T	KS-Test (1)
Barium	mg/kg	2.8E+02	3.5E+02	6.1E+02	J	mg/kg	3.5E+02	95% UCL-T	KS-Test (1)	3.5E+02	95% UCL-T	KS-Test (1)
Cadmium	mg/kg	3.7E+00	1.1E+01	2.1E+01	J	mg/kg	1.1E+01	95% UCL-T	KS-Test (1)	1.1E+01	95% UCL-T	KS-Test (1)
Chromium	mg/kg	1.2E+02	1.7E+02	1.2E+03	J	mg/kg	1.7E+02	95% UCL-T	KS-Test (1)	1.7E+02	95% UCL-T	KS-Test (1)
Copper	mg/kg	2.4E+02	3.8E+02	1.0E+03	J	mg/kg	3.8E+02	95% UCL-T	KS-Test (1)	3.8E+02	95% UCL-T	KS-Test (1)
Iron	mg/kg	2.8E+04	3.8E+04	1.2E+05	J	mg/kg	3.8E+04	95% UCL-T	KS-Test (1)	3.8E+04	95% UCL-T	KS-Test (1)
Lead	mg/kg	7.7E+02	1.5E+03	4.3E+03	J	mg/kg	1.5E+03	95% UCL-T	KS-Test (1)	1.5E+03	95% UCL-T	KS-Test (1)
Manganese	mg/kg	4.4E+02	6.1E+02	3.1E+03	J	mg/kg	6.1E+02	95% UCL-T	KS-Test (1)	6.1E+02	95% UCL-T	KS-Test (1)
Mercury (total)	mg/kg	1.3E+02	5.4E+02	5.9E+02		mg/kg	5.4E+02	95% UCL-T	KS-Test (1)	5.4E+02	95% UCL-T	KS-Test (1)
Nickel	mg/kg	4.2E+01	6.3E+01	1.9E+02		mg/kg	6.3E+01	95% UCL-T	KS-Test (1)	6.3E+01	95% UCL-T	KS-Test (1)
Silver	mg/kg	7.4E+00	1.5E+01	9.4E+01		mg/kg	1.5E+01	95% UCL-T	KS-Test (1)	1.5E+01	95% UCL-T	KS-Test (1)
Thallium	mg/kg	2.3E+00	2.9E+00	2.2E+01		mg/kg	2.9E+00	95% UCL-T	KS-Test (1)	2.9E+00	95% UCL-T	KS-Test (1)
Vanadium	mg/kg	5.8E+01	8.0E+01	2.5E+02		mg/kg	8.0E+01	95% UCL-T	KS-Test (1)	8.0E+01	95% UCL-T	KS-Test (1)
Zinc	mg/kg	2.9E+03	9.2E+03	2.5E+04	J	mg/kg	9.2E+03	95% UCL-T	KS-Test (1)	9.2E+03	95% UCL-T	KS-Test (1)
Aroclor® 1248	mg/kg	4.4E+00	n<10	4.4E+00		mg/kg	4.4E+00	Max	n<10	4.4E+00	Max	n<10
Benz[a]anthracene	mg/kg	9.3E-01	1.7E+00	4.0E+00		mg/kg	1.7E+00	95% UCL-T	KS-Test (1)	1.7E+00	95% UCL-T	KS-Test (1)
Benzo[a]pyrene	mg/kg	1.2E+00	2.1E+00	1.0E+01		mg/kg	2.1E+00	95% UCL-T	KS-Test (1)	2.1E+00	95% UCL-T	KS-Test (1)
Benzo[b]fluoranthene	mg/kg	1.5E+00	2.4E+00	1.3E+01		mg/kg	2.4E+00	95% UCL-T	KS-Test (1)	2.4E+00	95% UCL-T	KS-Test (1)
bis[2-Ethylhexyl]phthalate	mg/kg	2.9E+01	1.0E+02	3.8E+02		mg/kg	1.0E+02	95% UCL-T	KS-Test (1)	1.0E+02	95% UCL-T	KS-Test (1)
Dibenz[a,h]anthracene	mg/kg	3.6E-01	5.0E-01	9.0E-01		mg/kg	5.0E-01	95% UCL-T	KS-Test (1)	5.0E-01	95% UCL-T	KS-Test (1)
Indeno[1,2,3-cd]pyrene	mg/kg	6.7E-01	1.2E+00	2.6E+00		mg/kg	1.2E+00	95% UCL-T	KS-Test (1)	1.2E+00	95% UCL-T	KS-Test (1)
Phenanthrene	mg/kg	1.6E+00	4.0E+00	1.6E+01		mg/kg	4.0E+00	95% UCL-T	KS-Test (1)	4.0E+00	95% UCL-T	KS-Test (1)
Sediments												
Aluminum	mg/kg	9.9E+03	n<10	1.4E+04		mg/kg	1.4E+04	Max	n<10	1.4E+04	Max	n<10
Arsenic	mg/kg	5.0E+00	n<10	8.8E+00		mg/kg	8.8E+00	Max	n<10	8.8E+00	Max	n<10
Barium	mg/kg	1.5E+02	n<10	2.3E+02		mg/kg	2.3E+02	Max	n<10	2.3E+02	Max	n<10
Cadmium	mg/kg	3.7E+00	n<10	9.1E+00		mg/kg	9.1E+00	Max	n<10	9.1E+00	Max	n<10
Chromium	mg/kg	1.0E+02	n<10	1.6E+02		mg/kg	1.6E+02	Max	n<10	1.6E+02	Max	n<10
Copper	mg/kg	1.4E+02	n<10	1.9E+02		mg/kg	1.9E+02	Max	n<10	1.9E+02	Max	n<10
Iron	mg/kg	1.8E+04	n<10	2.1E+04		mg/kg	2.1E+04	Max	n<10	2.1E+04	Max	n<10
Lead	mg/kg	2.8E+02	n<10	4.7E+02		mg/kg	4.7E+02	Max	n<10	4.7E+02	Max	n<10

Table A-8. Medium-specific exposure point concentration summary
Wood-Ridge Site

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Scenario Timeframe:	Current/Future
Medium:	Soil/sediment
Exposure Medium:	Surface soil/sediment
Exposure Point:	Undeveloped Area surface soil/sediment

							Reasonable Maximum Exposure			Central Tendency		
Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Manganese	mg/kg	1.1E+02	n<10	1.8E+02		mg/kg	1.8E+02	Max	n<10	1.8E+02	Max	n<10
Mercury (total)	mg/kg	5.0E+02	n<10	1.2E+03		mg/kg	1.2E+03	Max	n<10	1.2E+03	Max	n<10
Nickel	mg/kg	2.5E+01	n<10	2.9E+01		mg/kg	2.9E+01	Max	n<10	2.9E+01	Max	n<10
Silver	mg/kg	1.6E+00	n<10	4.3E+00		mg/kg	4.3E+00	Max	n<10	4.3E+00	Max	n<10
Thallium	mg/kg	2.9E+00	n<10	4.8E+00		mg/kg	4.8E+00	Max	n<10	4.8E+00	Max	n<10
Vanadium	mg/kg	5.7E+01	n<10	6.9E+01		mg/kg	6.9E+01	Max	n<10	6.9E+01	Max	n<10
Zinc	mg/kg	1.4E+03	n<10	7.3E+03		mg/kg	7.3E+03	Max	n<10	7.3E+03	Max	n<10
Aroclor® 1248	mg/kg	2.2E-01	n<10	2.4E-01		mg/kg	2.4E-01	Max	n<10	2.4E-01	Max	n<10
Aroclor® 1260	mg/kg	3.8E-01	n<10	4.9E-01		mg/kg	4.9E-01	Max	n<10	4.9E-01	Max	n<10
Sum 1248 and 1260	mg/kg	5.9E-01	n<10	7.3E-01		mg/kg	7.3E-01	Max	n<10	7.3E-01	Max	n<10
Benz[a]anthracene	mg/kg	7.3E-01	n<10	1.7E+00		mg/kg	1.7E+00	Max	n<10	1.7E+00	Max	n<10
Benzo[a]pyrene	mg/kg	7.3E-01	n<10	1.6E+00		mg/kg	1.6E+00	Max	n<10	1.6E+00	Max	n<10
Benzo[b]fluoranthene	mg/kg	7.9E-01	n<10	1.8E+00		mg/kg	1.8E+00	Max	n<10	1.8E+00	Max	n<10
Dibenz[a,h]anthracene	mg/kg	2.5E-01	n<10	4.9E-01		mg/kg	4.9E-01	Max	n<10	4.9E-01	Max	n<10
Indeno[1,2,3-cd]pyrene	mg/kg	5.4E-01	n<10	1.2E+00		mg/kg	1.2E+00	Max	n<10	1.2E+00	Max	n<10
Phenanthrene	mg/kg	7.6E-01	n<10	1.8E+00		mg/kg	1.8E+00	Max	n<10	1.8E+00	Max	n<10

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-9 Medium-specific exposure point concentration summary
Wood-Ridge Site

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Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Subsurface soil
Exposure Point:	Developed Area subsurface soils (1-20 ft depths)

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	mg/kg	7.3E+00	n<10	8.4E+00		mg/kg	8.4E+00	Max	n<10	8.4E+00	Max	n<10
Barium	mg/kg	3.1E+02	n<10	3.2E+02		mg/kg	3.2E+02	Max	n<10	3.2E+02	Max	n<10
Cadmium	mg/kg	2.2E+00	n<10	3.4E+00		mg/kg	3.4E+00	Max	n<10	3.4E+00	Max	n<10
Chromium	mg/kg	7.4E+01	n<10	1.3E+02		mg/kg	1.3E+02	Max	n<10	1.3E+02	Max	n<10
Copper	mg/kg	2.7E+03	n<10	7.4E+03		mg/kg	7.4E+03	Max	n<10	7.4E+03	Max	n<10
Iron	mg/kg	2.2E+04	n<10	2.4E+04		mg/kg	2.4E+04	Max	n<10	2.4E+04	Max	n<10
Lead	mg/kg	2.0E+02	n<10	3.1E+02		mg/kg	3.1E+02	Max	n<10	3.1E+02	Max	n<10
Manganese	mg/kg	4.1E+02	n<10	5.7E+02		mg/kg	5.7E+02	Max	n<10	5.7E+02	Max	n<10
Mercury (total)	mg/kg	7.3E+02	n<10	2.8E+03		mg/kg	2.8E+03	Max	n<10	2.8E+03	Max	n<10
Nickel	mg/kg	5.5E+01	n<10	8.8E+01		mg/kg	8.8E+01	Max	n<10	8.8E+01	Max	n<10
Silver	mg/kg	5.3E+00	n<10	9.6E+00		mg/kg	9.6E+00	Max	n<10	9.6E+00	Max	n<10
Thallium	mg/kg	3.0E+00	n<10	5.4E+00		mg/kg	5.4E+00	Max	n<10	5.4E+00	Max	n<10
Zinc	mg/kg	1.1E+03	n<10	2.1E+03		mg/kg	2.1E+03	Max	n<10	2.1E+03	Max	n<10
Aroclor® 1260	mg/kg	3.6E-04	n<10	3.6E-01		mg/kg	3.6E-01	Max	n<10	3.6E-01	Max	n<10
2-Methylnaphthalene	mg/kg	1.1E+01	n<10	1.1E+01		mg/kg	1.1E+01	Max	n<10	1.1E+01	Max	n<10
Benz[a]anthracene	mg/kg	2.6E-01	n<10	2.6E-01		mg/kg	2.6E-01	Max	n<10	2.6E-01	Max	n<10
Benzene	mg/kg	1.4E+00	n<10	2.8E+00	J	mg/kg	2.8E+00	Max	n<10	2.8E+00	Max	n<10
Naphthalene	mg/kg	2.4E+00	n<10	2.4E+00		mg/kg	2.4E+00	Max	n<10	2.4E+00	Max	n<10
Phenanthrene	mg/kg	2.8E+00	n<10	5.5E+00		mg/kg	5.5E+00	Max	n<10	5.5E+00	Max	n<10
Toluene	mg/kg	8.0E-03	n<10	1.1E-02	J	mg/kg	1.1E-02	Max	n<10	1.1E-02	Max	n<10

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-10 Medium-specific exposure point concentration summary
Wood-Ridge Site

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Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Subsurface soil
Exposure Point:	Undeveloped Area subsurface soils (1-20 ft depths)

							Reasonable Maximum Exposure			Central Tendency		
Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	mg/kg	9.9E+03	1.4E+04	4.1E+04	J	mg/kg	1.4E+04	95% UCL-T	KS-Test (1)	1.4E+04	95% UCL-T	KS-Test (1)
Antimony	mg/kg	7.3E+00	2.6E+01	4.4E+01		mg/kg	2.6E+01	95% UCL-T	KS-Test (1)	2.6E+01	95% UCL-T	KS-Test (1)
Arsenic	mg/kg	1.4E+01	2.3E+01	5.4E+01	J	mg/kg	2.3E+01	95% UCL-T	KS-Test (1)	2.3E+01	95% UCL-T	KS-Test (1)
Barium	mg/kg	7.3E+02	1.5E+03	3.9E+03		mg/kg	1.5E+03	95% UCL-T	KS-Test (1)	1.5E+03	95% UCL-T	KS-Test (1)
Cadmium	mg/kg	5.4E+00	1.1E+01	1.7E+01		mg/kg	1.1E+01	95% UCL-T	KS-Test (1)	1.1E+01	95% UCL-T	KS-Test (1)
Chromium	mg/kg	2.4E+02	2.9E+02	3.6E+03		mg/kg	2.9E+02	95% UCL-T	KS-Test (1)	2.9E+02	95% UCL-T	KS-Test (1)
Copper	mg/kg	5.1E+02	1.4E+03	3.2E+03	J	mg/kg	1.4E+03	95% UCL-T	KS-Test (1)	1.4E+03	95% UCL-T	KS-Test (1)
Iron	mg/kg	4.0E+04	5.5E+04	1.6E+05	J	mg/kg	5.5E+04	95% UCL-T	KS-Test (1)	5.5E+04	95% UCL-T	KS-Test (1)
Lead	mg/kg	1.9E+03	9.2E+03	2.1E+04		mg/kg	9.2E+03	95% UCL-T	KS-Test (1)	9.2E+03	95% UCL-T	KS-Test (1)
Manganese	mg/kg	8.6E+02	1.4E+03	1.2E+04	J	mg/kg	1.4E+03	95% UCL-T	KS-Test (1)	1.4E+03	95% UCL-T	KS-Test (1)
Mercury (total)	mg/kg	6.9E+02	2.0E+03	1.7E+04		mg/kg	2.0E+03	95% UCL-T	KS-Test (1)	2.0E+03	95% UCL-T	KS-Test (1)
Nickel	mg/kg	6.5E+01	9.3E+01	1.9E+02		mg/kg	9.3E+01	95% UCL-T	KS-Test (1)	9.3E+01	95% UCL-T	KS-Test (1)
Silver	mg/kg	2.9E+01	7.5E+01	5.3E+02		mg/kg	7.5E+01	95% UCL-T	KS-Test (1)	7.5E+01	95% UCL-T	KS-Test (1)
Thallium	mg/kg	1.6E+00	2.8E+00	1.0E+01		mg/kg	2.8E+00	95% UCL-T	KS-Test (1)	2.8E+00	95% UCL-T	KS-Test (1)
Vanadium	mg/kg	9.9E+01	1.3E+02	9.8E+02		mg/kg	1.3E+02	95% UCL-T	KS-Test (1)	1.3E+02	95% UCL-T	KS-Test (1)
Zinc	mg/kg	2.4E+03	5.4E+03	2.3E+04		mg/kg	5.4E+03	95% UCL-T	KS-Test (1)	5.4E+03	95% UCL-T	KS-Test (1)
Aroclor® 1242	mg/kg	7.9E-01	n<10	7.9E-01		mg/kg	7.9E-01	Max	n<10	7.9E-01	Max	n<10
Aroclor® 1248	mg/kg	4.4E+00	n<10	4.4E+00		mg/kg	4.4E+00	Max	n<10	4.4E+00	Max	n<10
Aroclor® 1254	mg/kg	5.5E-01	n<10	5.5E-01		mg/kg	5.5E-01	Max	n<10	5.5E-01	Max	n<10
Sum 1242,1248,1254,1260	mg/kg	1.1E+00	n<10	5.2E+00		mg/kg	5.2E+00	Max	n<10	5.2E+00	Max	n<10
2-Methylnaphthalene	mg/kg	3.9E-01	7.2E-01	4.7E+00		mg/kg	7.2E-01	95% UCL-T	KS-Test (1)	7.2E-01	95% UCL-T	KS-Test (1)
Benz[a]anthracene	mg/kg	2.1E+00	2.2E+00	3.2E+01		mg/kg	2.2E+00	95% UCL-T	KS-Test (1)	2.2E+00	95% UCL-T	KS-Test (1)
Benzene	mg/kg	6.4E-03	6.8E-03	9.0E-03		mg/kg	6.8E-03	95% UCL-T	KS-Test (1)	6.8E-03	95% UCL-T	KS-Test (1)
Benzo[a]pyrene	mg/kg	1.7E+00	1.7E+00	2.7E+01		mg/kg	1.7E+00	95% UCL-T	KS-Test (1)	1.7E+00	95% UCL-T	KS-Test (1)
Benzo[b]fluoranthene	mg/kg	2.2E+00	2.5E+00	3.3E+01		mg/kg	2.5E+00	95% UCL-T	KS-Test (1)	2.5E+00	95% UCL-T	KS-Test (1)
Benzo[ghi]perylene	mg/kg	7.7E-01	8.9E-01	9.7E+00		mg/kg	8.9E-01	95% UCL-T	KS-Test (1)	8.9E-01	95% UCL-T	KS-Test (1)
Benzo[k]fluoranthene	mg/kg	7.1E-01	8.0E-01	8.3E+00		mg/kg	8.0E-01	95% UCL-T	KS-Test (1)	8.0E-01	95% UCL-T	KS-Test (1)
Carbazole	mg/kg	8.5E-01	7.4E-01	1.3E+01		mg/kg	7.4E-01	95% UCL-T	KS-Test (1)	7.4E-01	95% UCL-T	KS-Test (1)
Dibenz[a,h]anthracene	mg/kg	2.3E-01	3.2E-01	7.3E-01		mg/kg	3.2E-01	95% UCL-T	KS-Test (1)	3.2E-01	95% UCL-T	KS-Test (1)
Indeno[1,2,3-cd]pyrene	mg/kg	8.0E-01	8.6E-01	1.0E+01		mg/kg	8.6E-01	95% UCL-T	KS-Test (1)	8.6E-01	95% UCL-T	KS-Test (1)
Naphthalene	mg/kg	7.3E-01	1.4E+00	1.1E+01		mg/kg	1.4E+00	95% UCL-T	KS-Test (1)	1.4E+00	95% UCL-T	KS-Test (1)
Phenanthrene	mg/kg	3.4E+00	3.6E+00	7.1E+01	J	mg/kg	3.6E+00	95% UCL-T	KS-Test (1)	3.6E+00	95% UCL-T	KS-Test (1)
Toluene	mg/kg	2.0E+00	2.7E-01	4.7E+01		mg/kg	2.7E-01	95% UCL-T	KS-Test (1)	2.7E-01	95% UCL-T	KS-Test (1)

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-11 Medium-specific exposure point concentration summary
Wood-Ridge Site

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Water
Exposure Medium:	Surface Water
Exposure Point:	Undeveloped Area surface water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Iron	ug/L	1.7E+03	n<10	2.6E+03		ug/L	2.6E+03	Max	n<10	2.6E+03	Max	n<10
Lead	ug/L	7.1E+00	n<10	1.9E+01		ug/L	1.9E+01	Max	n<10	1.9E+01	Max	n<10
Manganese	ug/L	2.9E+02	n<10	4.1E+02		ug/L	4.1E+02	Max	n<10	4.1E+02	Max	n<10
Mercury (total)	ug/L	5.0E+00	n<10	1.8E+01		ug/L	1.8E+01	Max	n<10	1.8E+01	Max	n<10

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-12 Medium-specific exposure point concentration summary
Wood-Ridge Site

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Water
Exposure Medium:	Groundwater
Exposure Point:	Groundwater sitewide

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	ug/L	3.9E+00	5.2E+00	2.1E+01	J	ug/L	5.2E+00	95% UCL-T	KS-Test (1)	5.2E+00	95% UCL-T	KS-Test (1)
Barium	ug/L	3.2E+02	5.2E+02	9.3E+02		ug/L	5.2E+02	95% UCL-T	KS-Test (1)	5.2E+02	95% UCL-T	KS-Test (1)
Cadmium	ug/L	1.3E+00	3.8E+00	5.7E+00		ug/L	3.8E+00	95% UCL-T	KS-Test (1)	3.8E+00	95% UCL-T	KS-Test (1)
Copper	ug/L	1.8E+01	1.8E+01	3.6E+02		ug/L	1.8E+01	95% UCL-T	KS-Test (1)	1.8E+01	95% UCL-T	KS-Test (1)
Iron	ug/L	1.2E+04	1.6E+04	3.8E+04		ug/L	1.6E+04	95% UCL-T	KS-Test (1)	1.6E+04	95% UCL-T	KS-Test (1)
Manganese	ug/L	1.4E+03	4.8E+03	6.6E+03		ug/L	4.8E+03	95% UCL-T	KS-Test (1)	4.8E+03	95% UCL-T	KS-Test (1)
Mercury (total)	ug/L	5.0E+00	2.8E+01	5.4E+01		ug/L	2.8E+01	95% UCL-T	KS-Test (1)	2.8E+01	95% UCL-T	KS-Test (1)
Nickel	ug/L	1.1E+01	2.0E+01	1.2E+02	J	ug/L	2.0E+01	95% UCL-T	KS-Test (1)	2.0E+01	95% UCL-T	KS-Test (1)
Thallium	ug/L	3.3E+00	3.9E+00	1.4E+01		ug/L	3.9E+00	95% UCL-T	KS-Test (1)	3.9E+00	95% UCL-T	KS-Test (1)
Vanadium	ug/L	8.6E+00	2.5E+01	5.1E+01		ug/L	2.5E+01	95% UCL-T	KS-Test (1)	2.5E+01	95% UCL-T	KS-Test (1)
1,4-Dichlorobenzene	ug/L	2.0E+01	2.7E+01	4.0E+00		ug/L	4.0E+00	Max	KS-Test (2)	4.0E+00	Max	KS-Test (2)
2-Methylnaphthalene	ug/L	1.9E+01	3.7E+01	1.0E+00		ug/L	1.0E+00	Max	KS-Test (2)	1.0E+00	Max	KS-Test (2)
4-Methylphenol	ug/L	9.2E+00	1.3E+01	6.2E+01		ug/L	1.3E+01	95% UCL-T	KS-Test (1)	1.3E+01	95% UCL-T	KS-Test (1)
bis[2-ethylhexyl]phthalate	ug/L	2.0E+01	2.6E+01	6.0E+00		ug/L	6.0E+00	Max	KS-Test (2)	6.0E+00	Max	KS-Test (2)
Naphthalene	ug/L	1.3E+01	1.7E+01	1.0E+02		ug/L	1.7E+01	95% UCL-T	KS-Test (1)	1.7E+01	95% UCL-T	KS-Test (1)
4-Methyl-2-pentanone	ug/L	7.2E+00	9.5E+00	3.1E+01		ug/L	9.5E+00	95% UCL-T	KS-Test (1)	9.5E+00	95% UCL-T	KS-Test (1)
Acetone	ug/L	2.9E+01	1.1E+02	1.0E+02	J	ug/L	1.0E+02	Max	KS-Test (2)	1.0E+02	Max	KS-Test (2)
Benzene	ug/L	9.3E+00	1.9E+01	1.4E+02		ug/L	1.9E+01	95% UCL-T	KS-Test (1)	1.9E+01	95% UCL-T	KS-Test (1)
Chlorobenzene	ug/L	5.0E+00	6.4E+00	2.8E+01		ug/L	6.4E+00	95% UCL-T	KS-Test (1)	6.4E+00	95% UCL-T	KS-Test (1)
Chloroethane	ug/L	6.3E+00	7.8E+00	2.0E+01	J	ug/L	7.8E+00	95% UCL-T	KS-Test (1)	7.8E+00	95% UCL-T	KS-Test (1)
Toluene	ug/L	7.9E+01	3.9E+01	1.7E+03		ug/L	3.9E+01	95% UCL-T	KS-Test (1)	3.9E+01	95% UCL-T	KS-Test (1)
Xylene isomers	ug/L	3.7E+01	5.8E+01	3.9E+02		ug/L	5.8E+01	95% UCL-T	KS-Test (1)	5.8E+01	95% UCL-T	KS-Test (1)
1,2-Dichloroethene isomers	ug/L	8.1E+00	1.2E+01	4.5E+01		ug/L	1.2E+01	95% UCL-T	KS-Test (1)	1.2E+01	95% UCL-T	KS-Test (1)

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

Table A-13 Medium-specific exposure point concentration summary
Wood-Ridge Site

DRAFT

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Air
Exposure Point:	Outdoor air

							Reasonable Maximum Exposure			Central Tendency		
Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum detected value	Maximum Qualifier	EPC Units	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Mercury vapor	ng/m3	1.2E+01	3.3E+01	6.1E+01		ng/m3	3.3E+01	95% UCL-T	KS-Test (1)	3.3E+01	95% UCL-T	KS-Test (1)

Duplicate sample results were averaged in calculations
Distributional fits were assessed using probability plots and Kolmogorov-Smirnov goodness-of-fit test
Arithmetic mean and 95% UCL of normal data were calculated using half the detection limit for non-detects. 95% UCL was not calculated for less than 10 data points.

95% UCL-T - 95% UCL of log-transformed data
(1) KS-Test indicates data are log-normally distributed
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum detected concentration used for EPC.

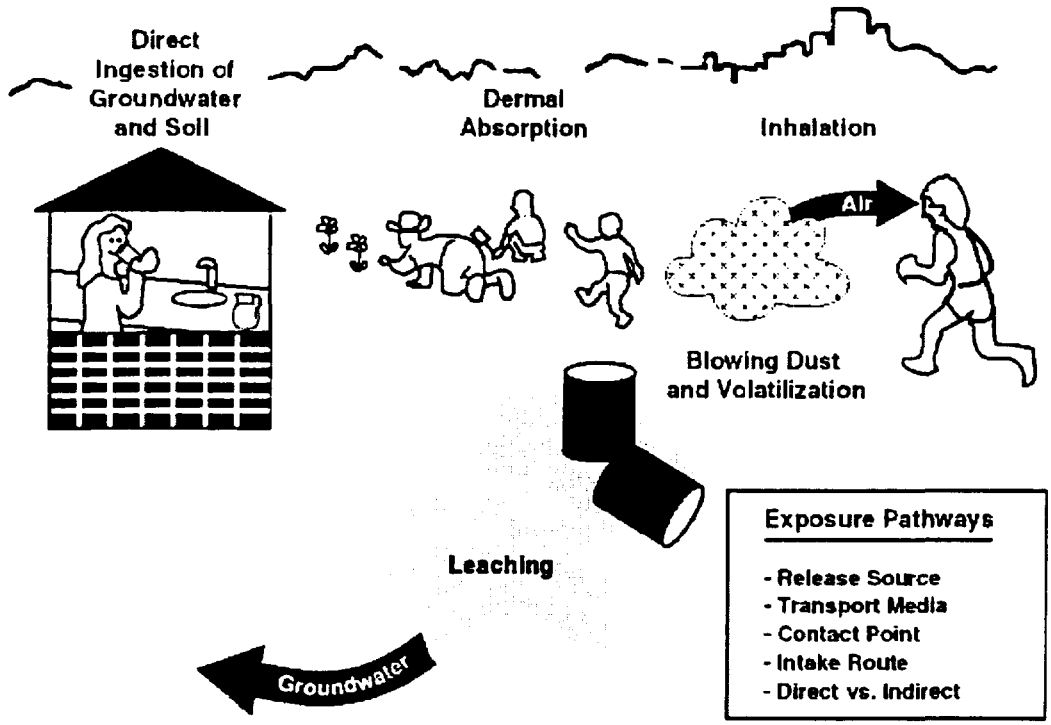
Appendix B

Region IX Tables of Screening Values

EPA United States Environmental Protection Agency Waste Programs

Region 9

Preliminary Remediation Goals



Preliminary Remediation Goals (PRGs) are tools for evaluating and cleaning up contaminated sites. They are risk-based concentrations derived from standardized equations, combining exposure information assumptions and EPA toxicity data. The PRGs contained in the Region 9 PRG Table are generic; they are calculated without site specific information. However, they may be re-calculated using site specific data.

PRGs should be viewed as Agency guidelines, not legally enforceable standards. They are used for site "screening" and as initial cleanup goals if applicable. PRGs are not *de facto* cleanup standards and should not be applied as such. However, they are helpful in providing long-term targets to use during the analysis of different remedial alternatives. By developing PRGs early in the decision-making process, design staff may be able to streamline the consideration of remedial alternatives.

Background Information (241K PDF)
This document is also available in WordPerfect (174K).

What's New in 2000

Frequently Asked Questions About the PRG Tables

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Useful Toxicology/Risk Assessment Links

R9 PRG Tables: summary table that presents the final list of generic PRG (for soil, air, and water) selected for site screening in Region 9.

A-Bu | Ca-De | Di-Fe | Fl-Mo | Na-Pu | Py-Z

These tables can be downloaded in PDF format (130 K).

InterCalc Tables: present additional information not available in the R9 PRG Table above.

Soil Calculations: lists pathway-specific values for soils under residential and industrial land-use scenarios.
A-Bu | Ca-De | Di-Fe | Fl-Mo | Na-Pu | Py-Z

Air-Water Calculations: lists pathway-specific values for air and water assuming a residential exposure scenario.
A-Bu | Ca-De | Di-Fe | Fl-Mo | Na-Pu | Py-Z

Toxicity Values: lists toxicity values used in the PRG calculations.
A-Bu | Ca-De | Di-Fe | Fl-Mo | Na-Pu | Py-Z

Phys-Chem Data: includes volatilization factors (VF) and soil saturation values (SAT) for VOCs only.
A-Di | Ep-Tr

The InterCalc Tables may be downloaded in PDF Format (144 K). The complete set, which includes both R9 PRG Tables and the InterCalc Tables, is also available as an Excel Workbook file (647 K).

Region 9 Waste Home | Region 9 Superfund Home | Region 9 PRG Home
Region 9 Home | EPA Home | Search | Comments/Questions

Region 9 Office: 75 Hawthorne St., San Francisco, Calif., 94105
Send PRG-related comments and questions to smucker.stan@epa.gov

Updated: November 22, 2000

URL: http://www.epa.gov/region09/waste/sfund/prg/otherlinks.htm

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DISCLAIMER

Preliminary remediation goals (PRGs) focus on common exposure pathways and may not consider all exposure pathways encountered at CERCLA / RCRA sites (Exhibit 1-1). PRGs do not consider impact to groundwater or address ecological concerns. PRGs are specifically not intended as a (1) stand-alone decision-making tool, (2) as a substitute for EPA guidance for preparing baseline risk assessments, or (3) a rule to determine if a waste is hazardous under RCRA.

The guidance set out in this document is not final Agency action. It is not intended, nor can it be relied upon to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided herein, or act at variance with the guidance, based on an analysis of specific circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

1.0 INTRODUCTION

Region 9 Preliminary Remediation Goals (PRGs) are risk-based tools for evaluating and cleaning up contaminated sites. They are being used to streamline and standardize all stages of the risk decision-making process.

The Region 9 PRG table combines current EPA toxicity values with "standard" exposure factors to estimate contaminant concentrations in environmental media (soil, air, and water) that are considered protective of humans, including sensitive groups, over a lifetime. Chemical concentrations above these levels would not automatically designate a site as "dirty" or trigger a response action. However, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate. Further evaluation may include additional sampling, consideration of ambient levels in the environment, or a reassessment of the assumptions contained in these screening-level estimates (e.g. appropriateness of route-to-route extrapolations, appropriateness of using chronic toxicity values to evaluate childhood exposures, appropriateness of generic exposure factors for a specific site etc.).

The PRG concentrations presented in the table can be used to screen pollutants in environmental media, trigger further investigation, and provide an initial cleanup goal if applicable. When considering PRGs as preliminary goals, residential concentrations should be used for maximum beneficial uses of a property. Industrial concentrations are included in the table as an alternative cleanup goal for soils. In general, it is not recommended that industrial PRGs be used for screening sites unless they are used in conjunction with residential values.

Before applying PRGs as screening tools or initial goals, the user of the table should consider whether the exposure pathways and exposure scenarios at the site are fully accounted for in the PRG calculation. Region 9 PRG concentrations are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e. ingestion, dermal contact, and inhalation) for specific land-use conditions and do not consider impact to groundwater or ecological receptors (see Developing a Conceptual Site Model below).

EXHIBIT 1-1
TYPICAL EXPOSURE PATHWAYS BY MEDIUM
FOR RESIDENTIAL AND INDUSTRIAL LAND USES[a]

EXPOSURE PATHWAYS, ASSUMING:		
MEDIUM	RESIDENTIAL LAND USE	INDUSTRIAL LAND USE
Ground Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatiles	Inhalation of volatiles
	Dermal absorption from bathing	Dermal absorption
Surface Water	***Ingestion from drinking***	Ingestion from drinking
	Inhalation of volatiles	Inhalation of volatiles
	Dermal absorption from bathing	Dermal absorption
	Ingestion during swimming	
	Ingestion of contaminated fish	
Soil	***Ingestion***	***Ingestion***
	Inhalation of particulates	***Inhalation of particulates***
	Inhalation of volatiles	***Inhalation of volatiles***
	Exposure to indoor air from soil gas	Exposure to indoor air from soil gas
	Exposure to ground water contaminated by soil leachate	Exposure to ground water contaminated by soil leachate
	Ingestion via plant, meat, or dairy products	Inhalation of particulates from trucks and heavy equipment
	Dermal absorption	***Dermal absorption***

Footnote:
[a]Exposure pathways considered in the PRG calculations are indicated in boldface italics.

2.0 READING THE PRG TABLE

2.1 General Considerations

With the exceptions described below, PRGs are chemical concentrations that correspond to fixed levels of risk (i.e. either a one-in-one million [10^{-6}] cancer risk or a noncarcinogenic hazard quotient of 1) in soil, air, and water. In most cases, where a substance causes both cancer and noncancer (systemic) effects, the 10^{-6} cancer risk will result in a more stringent criteria and consequently this value is presented in the hard copy of the table. PRG concentrations that equate to a 10^{-6} cancer risk are indicated by "ca". PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns are indicated by "nc".

If the risk-based concentrations are to be used for site screening, it is recommended that both cancer and noncancer-based PRGs be used. Both carcinogenic and noncarcinogenic values may be obtained at the Region 9 PRG homepage at:

http://www.epa.gov/region09/waste/sfund/prg/

It has come to my attention that some users have been multiplying the cancer PRG concentrations by 10 or 100 to set "action levels" for triggering remediation or to set less stringent cleanup levels for a specific site after considering non-risk-based factors such as ambient levels, detection limits, or technological feasibility. This risk management practice recognizes that there may be a range of values that may be "acceptable" for carcinogenic risk (EPA's risk management range is one-in-a-million [10^{-6}] to one-in-ten thousand [10^{-4}]). However, this practice could lead one to overlook serious noncancer health threats and it is strongly recommended that the user consult with a toxicologist or regional risk assessor before doing this. For carcinogens, I have indicated by asterisk ("ca*") in the PRG table where the noncancer PRGs would be exceeded if the cancer value that is displayed is multiplied by 100. Two stars ("ca**") indicate that the noncancer values would be exceeded if the cancer PRG were multiplied by 10. There is no range of "acceptable" noncarcinogenic "risk" so that under no circumstances should noncancer PRGs be multiplied by 10 or 100, when setting final cleanup criteria.

In general, PRG concentrations in the table are risk-based but for soil there are two important exceptions: (1) for several volatile chemicals, PRGs are based on the soil saturation equation ("sat") and (2) for relatively less toxic inorganic and semivolatile contaminants, a non-risk based "ceiling limit" concentration is given as 10^{+5} mg/kg ("max").

Also included in the PRG table are soil screening levels (SSLs) for protection of groundwater (see Section 2.3); and, California EPA PRGs ("CAL-Modified PRGs") for specific chemicals where CAL-EPA screening values may be "significantly" more restrictive than the federal values (see Section 2.4).

2.2 Toxicity Values

Heirarchy of Toxicity Values

EPA toxicity values, known as noncarcinogenic reference doses (RfD) and carcinogenic slope factors (SF) were obtained from IRIS, NCEA (formerly ECAO) through September 2000, and HEAST. The priority among sources of toxicological constants of the table in order of preference is as follows: (1) IRIS (indicated by "i"), (2) NCEA ("n"), (3) HEAST ("h"), (4) withdrawn from IRIS or HEAST and under review ("x") or obtained from other EPA documents ("o").

Inhalation Conversion Factors

As of January 1991, IRIS and NCEA databases no longer present RfDs or SFs for the inhalation route. These criteria have been replaced with reference concentrations (RfC) for noncarcinogenic effects and unit risk factors (URF) for carcinogenic effects. However, for purposes of estimating risk and calculating risk-based concentrations, inhalation reference doses (RfDi) and inhalation slope factors (SFi) are preferred. This is not a problem for most chemicals because the inhalation toxicity criteria are easily converted. To calculate an RfDi from an RfC, the following equation and assumptions may be used for most chemicals:

$$\text{RfDi}\ \frac{\text{mg}}{(\text{kg}-\text{day})} = \text{RfC}\,(\text{mg}/\text{m}^3) \times \frac{20\text{m}^3}{\text{day}} \times \frac{1}{70\text{kg}}$$

Likewise, to calculate an SFi from an inhalation URF, the following equation and assumptions may be used:

$$\text{SFi}\ \frac{(\text{kg}-\text{day})}{(\text{mg})} = \text{URF}(\text{m}^3/\text{ug}) \times \frac{\text{day}}{20\text{m}^3} \times 70\text{kg} \times \frac{10^3\ \text{ug}}{\text{mg}}$$

Substances with New Toxicity Values

To help users rapidly identify substances with new toxicity values, these chemicals are printed in boldface type. This issue of the PRG table contains new or revised toxicity values for **benzene, chlorine, cyclohexane, 4,4'-dichlorobenzophenone, 1,3-dichloropropene, diisononyl phthalate, n,n-diphenyl-1,4 benzenediamine (DPPD), dysprosium, ethylene glycol monobutyl ether, hexachlorobutadiene, monomethyl and dimethyl hydrazines, 1,1'-sulfonylbis(4-chlorobenzene), thallium, trimellitic anhydride (TMAN), triphenylphosphine oxide, tris(2-chloroethyl) phosphate, vinyl chloride and uranium.** In addition, **lead** in industrial soils has a new PRG based on the recommendations of the Technical Review Workgroup (TRW) for Lead.

Route-to-Route Methods

Route-to-route extrapolations ("r") were frequently used when there were no toxicity values available for a given route of exposure. Oral cancer slope factors ("SFo") and reference doses ("RfDo") were used for both oral and inhaled exposures for organic compounds lacking inhalation values. Inhalation slope factors ("SFi") and inhalation reference doses ("RfDi") were used for both inhaled and oral exposures for organic compounds lacking oral values. Route extrapolations were not performed for inorganics due to portal of entry effects and known differences in absorption efficiency for the two routes of exposure.

An additional route extrapolation is the use of oral toxicity values for evaluating dermal exposures. For many chemicals, a scientifically defensible data base does not exist for making an adjustment of an oral slope factor/RfD to estimate a dermal toxicity value. Based on the current guidance (USEPA 2000a), the only chemical for which an adjustment is recommended is cadmium. An oral absorption efficiency of 5% is assumed for cadmium which leads to an estimated dermal reference dose (RfDd) of 2.5E-05. Please note that the PRG calculations for cadmium are based on this adjustment.

Although route-to-route methods are a useful screening procedure, the appropriateness of these default assumptions for specific contaminants should be verified by a toxicologist or regional risk assessor. Please note that whenever route-extrapolated values are used to calculate risk-based PRGs, additional uncertainties are introduced in the calculation.

2.3 Soil Screening Levels

Generic, soil screening levels (SSLs) for the protection of groundwater have been included in the PRG table for 100 of the most common contaminants at Superfund sites. Generic SSLs are derived using default values in standardized equations presented in *Soil Screening Guidance* (available from NTIS as document numbers PB96-963502 and PB96-963505 or EPA/540/R-95/128 and EPA/540/R-96/018).

The SSLs were developed using a default dilution-attenuation factor (DAF) of 20 to account for natural processes that reduce contaminant concentrations in the subsurface. Also included are generic SSLs that assume no dilution or attenuation between the source and the receptor well (i.e., a DAF of 1). These values can be used at sites where little or no dilution or attenuation of soil leachate concentrations is expected at a site (e.g., sites with shallow water tables, fractured media, karst topography, or source size greater than 30 acres).

In general, if an SSL is not exceeded for the migration to groundwater pathway, the user may eliminate this pathway from further investigation.

2.4 "Cal-Modified PRGs"

When EPA Region 9 first came out with a Draft of the PRG tables in 1992, there was concern expressed by California EPA's Department of Toxic Substances and Control (DTSC) that for some chemicals, the risk-based concentrations calculated using Cal-EPA toxicity

values were "significantly" more protective than the risk-based PRGs calculated by Region 9. At an interagency meeting comprised of mostly toxicologists, it was agreed that values that differed by a factor of four or more would be said to have "significant" difference in risk-based PRGs. Although four was a somewhat arbitrary cutoff point, it reflects a consideration that the numbers are not very precise and at best, are order-of-magnitude estimates of risk.

Cal-Modified PRGs are included for those chemicals where Cal-EPA values are "significantly" more protective. The original list of Cal-Modified PRGs (cadmium, chromium 6, nickel, PAHs benzo(a)pyrene and benzo(k)fluoranthene, tetrachloroethylene [PCE] and lead which has been withdrawn) were based on exposure factors and modeling assumptions presented in California EPA's Preliminary Endangerment Assessment Guidance Manual (PEA 1994). Please note that any Cal-Modified PRGs that have been added to this original list after 1995 have been calculated using Cal-EPA toxicity values and Region 9 exposure methodology. In this issue of the PRG table, Cal-Modified PRGs have been added for **1,1-dichloroethane** and **MTBE**. In the State of California, Cal-Modified PRGs should be used as screening levels because they are more stringent than the Federal numbers.

2.5 Miscellaneous

Volatile organic compounds (VOCs) are indicated by "1" in the VOC column of the table and in general, are defined as those chemicals having a Henry's Law constant greater than 10^{-5} (atm-m^3/mol) and a molecular weight less than 200 g/mole). Three borderline chemicals (dibromochloromethane, 1,2-dibromochloropropane, and pyrene) which do not strictly meet these criteria of volatility have also been included based upon discussions with other state and federal agencies and after a consideration of vapor pressure characteristics etc. Volatile organic chemicals are evaluated for potential volatilization from soil/water to air using volatilization factors (see Section 4.1).

Chemical-specific dermal absorption values for contaminants in soil and dust are presented for arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, TCDD, PAHs, PCBs, and pentachlorophenols as recommended in the "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance" (USEPA 2000). Otherwise, default skin absorption fractions are assumed to be 0.10 for nonvolatile organics. Please note that previous defaults of 0.01 and 0.10 for inorganics and VOCs respectively, have been withdrawn per new guidance.

3.0 USING THE PRG TABLE

The decision to use PRGs at a site will be driven by the potential benefits of having generic risk-based concentrations in the absence of site-specific risk assessments. The original intended use of PRGs was to provide initial cleanup goals for individual chemicals given specific medium and land-use combinations (see RAGS Part B, 1991), however risk-based concentrations have several applications. They can also be used for:

- Setting health-based detection limits for chemicals of potential concern
- Screening sites to determine whether further evaluation is appropriate
- Calculating cumulative risks associated with multiple contaminants

A few basic procedures are recommended for using PRGs properly. These are briefly described below. Potential problems with the use of PRGs are also identified.

3.1 Developing a Conceptual Site Model

The primary condition for use of PRGs is that exposure pathways of concern and conditions at the site match those taken into account by the PRG framework. Thus, it is always necessary to develop a conceptual site model (CSM) to identify likely contaminant source areas, exposure pathways, and potential receptors. This information can be used to determine the applicability of PRGs at the site and the need for additional information. For those pathways not covered by PRGs, a risk assessment specific to these additional pathways may be necessary. Nonetheless, the PRG lookup values will still be useful in such situations for focusing further investigative efforts on the exposure pathways not addressed.

To develop a site-specific CSM, perform an extensive records search and compile existing data (e.g. available site sampling data, historical records, aerial photographs, and hydrogeologic information). Once this information is obtained, CSM worksheets such as those provided in ASTM's *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (1995) can be used to tailor the generic worksheet model to a site-specific CSM. The final CSM diagram represents linkages among contaminant sources, release mechanisms, exposure pathways and routes and receptors. It summarizes our understanding of the contamination problem.

As a final check, the CSM should answer the following questions:

- Are there potential ecological concerns?
- Is there potential for land use other than those covered by the PRGs (that is, residential and industrial)?
- Are there other likely human exposure pathways that were not considered in development of the PRGs (e.g. impact to groundwater, local fish consumption, raising beef, dairy, or other livestock)?
- Are there unusual site conditions (e.g. large areas of contamination, high fugitive dust levels, potential for indoor air contamination)?

If any of these four conditions exist, the PRG may need to be adjusted to reflect this new information. Suggested references for evaluating pathways not currently evaluated by Region 9 PRG's are presented in Exhibit 3-1.

EXHIBIT 3-1
SUGGESTED READINGS FOR EVALUATING EXPOSURE PATHWAYS NOT CURRENTLY ADDRESSED BY REGION 9 PRGs

EXPOSURE PATHWAY	REFERENCE
Migration of contaminants to an underlying potable aquifer	*Soil Screening Guidance* (USEPA 1996a,b), *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM 1995)
Ingestion via plant uptake	*Soil Screening Guidance* (USEPA 1996a,b)
Ingestion via meat, dairy products, human milk	*Estimating Exposure to Dioxin-Like Compounds* (USEPA 1994a)
Inhalation of volatiles that have migrated into basements	*User's Guide for Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings* (USEPA 1997a)
Ecological pathways	*Ecological Risk Assessment: Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, (USEPA 1997b), *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities* (CAL-EPA 1996)

3.2 Background Levels Evaluation

A necessary step in determining the usefulness of Region 9 PRGs is the consideration of background contaminant concentrations. EPA may be concerned with two types of background at sites: naturally occurring and anthropogenic. Natural background is usually limited to metals whereas anthropogenic (i.e. human-made) "background" includes both organic and inorganic contaminants. Before embarking on an extensive sampling and analysis program to determine local background concentrations in the area, one should first compile existing data on the subject. Far too often there is pertinent information in the literature that gets ignored, resulting in needless expenditures of time and money.

Generally EPA does not clean up below natural background. In some cases, the predictive risk-based models generate PRG levels that lie within or even below typical background. If natural background concentrations are higher than the risk-based PRGs, an adjustment of the PRG is probably needed. Exhibit 3-2 presents summary statistics for selected elements in soils that have background levels that may exceed risk-based PRGs. An illustrative example of this is naturally occurring arsenic in soils which frequently is higher than the risk-based concentration set at a one-in-one-million cancer risk (the PRG for residential soils is 0.39 mg/kg). After considering

background concentrations in a local area, EPA Region 9 has at times used the non-cancer PRG (22 mg/kg) to evaluate sites recognizing that this value tends to be above background levels yet still falls within the range of soil concentrations (0.39-39 mg/kg) that equates to EPA's "acceptable" cancer risk range of 10E-6 to 10E-4.

Where anthropogenic "background" levels exceed PRGs and EPA has determined that a response action is necessary and feasible, EPA's goal will be to develop a comprehensive response to the widespread contamination. This will often require coordination with different authorities that have jurisdiction over the sources of contamination in the area.

EXHIBIT 3-2
BACKGROUND CONCENTRATIONS OF SELECTED ELEMENTS IN SOILS

TRACE	U.S. STUDY DATA[1]			CALIFORNIA DATA[2]		
ELEMENT	Range	GeoMean	ArMean	Range	GeoMean	ArMean
Arsenic	<.1-97	5.2 mg/kg	7.2 mg/kg	0.59-11	2.75 mg/kg	3.54 mg/kg
Beryllium	<1-15	0.63 "	0.92 "	0.10-2.7	1.14 "	1.28 "
Cadmium	<1-10	--	<1	0.05-1.7	0.26	0.36
Chromium	1-2000	37	54	23-1579	76.25	122.08
Nickel	<5-700	13	19	9.0-509	35.75	56.60

[1]Shacklette and Hansford, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States",USGS Professional Paper 1270, 1984.

[2]Bradford et. al, "Background Concentrations of Trace and Major Elements in California Soils", Kearney Foundation Special Report, UC-Riverside and CAL-EPA DTSC, March 1996.

3.3 Screening Sites with Multiple Pollutants

A suggested stepwise approach for PRG-screening of sites with multiple pollutants is as follows:

- Perform an extensive records search and compile existing data.
- Identify site contaminants in the PRG table. Record the PRG concentrations for various media and note whether PRG is based on cancer risk (indicated by "ca") or noncancer hazard (indicated by "nc"). Segregate cancer PRGs from non-cancer PRGs and exclude (but don't eliminate) non-risk based PRGs ("sat" or "max").
- For cancer risk estimates, take the site-specific concentration (maximum or 95 UCL) and divide by the PRG concentrations that are designated for cancer evaluation ("ca"). Multiply this ratio by 10^{-6} to estimate chemical-specific risk for a reasonable maximum exposure (RME). For multiple pollutants, simply add the risk for each chemical:

$$Risk = [\ (\frac{conc_x}{PRG_x}) + (\frac{conc_y}{PRG_y}) + (\frac{conc_z}{PRG_z})]\ x\ 10^{-6}$$

- For non-cancer hazard estimates. Divide the concentration term by its respective non-cancer PRG designated as "nc" and sum the ratios for multiple contaminants. The cumulative ratio represents a non-carcinogenic hazard index (HI). A hazard index of 1 or less is generally considered "safe". A ratio greater than 1 suggests further evaluation. **[Note that carcinogens may also have an associated non-cancer PRG that is not listed in the printed copy of the table sent to folks on the mailing list. To obtain these values, the user should view or download the PRG table at our website and display the appropriate sections.]**

$$Hazard\ Index = [\ (\frac{conc_x}{PRG_x}) + (\frac{conc_y}{PRG_y}) + (\frac{conc_z}{PRG_z})]$$

For more information on screening site risks, the reader should contact EPA Region 9's Technical Support Group.

3. 4 Potential Problems

As with any risk-based tool, the potential exists for misapplication. In most cases the root cause will be a lack of understanding of the intended use of Region 9 PRGs. In order to prevent misuse of PRGs, the following should be avoided:

- Applying PRGs to a site without adequately developing a conceptual site model that identifies relevant exposure pathways and exposure scenarios,
- Not considering background concentrations when choosing PRGs as cleanup goals,
- Use of PRGs as cleanup levels without the nine-criteria analysis specified in the National Contingency Plan (or, comparable analysis for programs outside of Superfund),
- Use of PRGs as cleanup levels without verifying numbers with a toxicologist or regional risk assessor,
- Use of antiquated PRG tables that have been superseded by more recent publications,
- Not considering the effects of additivity when screening multiple chemicals, and
- Adjusting PRGs upward by factors of 10 or 100 without consulting a toxicologist or regional risk assessor.

4.0 TECHNICAL SUPPORT DOCUMENTATION

Region 9 PRGs consider human exposure hazards to chemicals from contact with contaminated soils, air, and water. The emphasis of the PRG equations and technical discussion are aimed at developing screening criteria for soils, since this is an area where few standards exist. For air and water, additional reference concentrations or standards are available for many chemicals (e.g. MCLs, non-zero MCLGs, AWQC, and NAAQS) and consequently the discussion of these media are brief.

4.1 Soils - Direct Ingestion

Calculation of risk-based PRGs for direct ingestion of soil is based on methods presented in RAGS HHEM, Part B (USEPA 1991a) and *Soil Screening Guidance* (USEPA 1996a,b). Briefly, these methods backcalculate a soil concentration level from a target risk (for carcinogens) or hazard quotient (for noncarcinogens).

A number of studies have shown that inadvertent ingestion of soil is common among children 6 years old and younger (Calabrese et al. 1989, Davis et al. 1990, Van Wijnen et al. 1990). To take into account the higher soil intake rate for children, two different approaches are used to estimate PRGs, depending on whether the adverse health effect is cancer or some effect other than cancer.

For carcinogens, the method for calculating PRGs uses an age-adjusted soil ingestion factor that takes into account the difference in daily soil ingestion rates, body weights, and exposure duration for children from 1 to 6 years old and others from 7 to 31 years old. This health-protective approach is chosen to take into account the higher daily rates of soil ingestion in children as well as the longer duration of exposure that is anticipated for a long-term resident. For more on this method, see USEPA RAGs Part B (1991a).

For noncarcinogenic concerns, the more protective method of calculating a soil PRG is to evaluate childhood exposures separately from adult exposures. In other words, an age-adjustment factor is not applied as was done for carcinogens. This approach is considered conservative because it combines the higher 6-year exposure for children with chronic toxicity criteria. In their analysis of the method, the Science Advisory Board (SAB) indicated that, for most chemicals, the approach may be overly protective. However, they noted that there are specific instances when the chronic RfD may be based on endpoints of toxicity that are specific to children (e.g. fluoride and nitrates) or when the dose-response is steep (i.e., the dosage difference between the no-observed-adverse-effects level [NOAEL] and an adverse effects level is small). Thus, for the purposes of screening, EPA Region 9 has adopted this approach for calculating soil PRGs for noncarcinogenic health concerns.

4.2 Soils - Vapor and Particulate Inhalation

Agency toxicity criteria indicate that risks from exposure to some chemicals via inhalation far outweigh the risk via ingestion; therefore soil PRGs have been designed to address this pathway as well. The models used to calculate PRGs for inhalation of volatiles/particulates are updates of risk assessment methods presented in RAGS Part B (USEPA 1991a) and are identical to the *Soil Screening Guidance: User's Guide and Technical Background Document* (USEPA 1996a,b).

To address the soil-to-air pathways the PRG calculations incorporate volatilization factors (VF_s) for volatile contaminants and particulate emission factors (PEF) for nonvolatile contaminants. These factors relate soil contaminant concentrations to air contaminant concentrations that may be inhaled on-site. The VF_s and PEF equations can be broken into two separate models: an emission model to estimate emissions of the contaminant from the soil and a dispersion model to simulate the dispersion of the contaminant in the atmosphere.

It should be noted that the box model in RAGS Part B has been replaced with a dispersion term (Q/C) derived from a modeling exercise using meteorological data from 29 locations across the United States because the box model may not be applicable to a broad range of site types and meteorology and does not utilize state-of-the-art techniques developed for regulatory dispersion modeling. The dispersion model for both volatiles and particulates is the AREA-ST, an updated version of the Office of Air Quality Planning and Standards, Industrial Source Complex Model, ISC2. However, different Q/C terms are used in the VF and PEF equations. Los Angeles was selected as the 90th percentile data set for volatiles and Minneapolis was selected as the 90th percentile data set for fugitive dusts (USEPA 1996 a,b). A default source size of 0.5 acres was chosen for the PRG calculations. This is consistent with the default exposure area over which Region 9 typically averages contaminant concentrations in soils. If unusual site conditions exist such that the area source is substantially larger than the default source size assumed here, an alternative Q/C could be applied (see USEPA 1996a,b).

Volatilization Factor for Soils

Volatile chemicals, defined as those chemicals having a Henry's Law constant greater than 10^{-5} (atm-m^3/mol) and a molecular weight less than 200 g/mole, were screened for inhalation exposures using a volatilization factor for soils (VF_s). Please note that VF_s's are available at our website.

The emission terms used in the VF_s are chemical-specific and were calculated from physical-chemical information obtained from several sources. The priority of these sources were as follows: *Soil Screening Guidance* (USEPA 1996a,b), *Superfund Chemical Data Matrix* (USEPA 1996c), *Fate and Exposure Data* (Howard 1991), *Subsurface Contamination Reference Guide* (EPA 1990a), and *Superfund Exposure Assessment Manual* (SEAM, EPA 1988). In those cases where Diffusivity Coefficients (Di) were not provided in existing literature, Di's were calculated using Fuller's Method described in SEAM. A surrogate term was required for some chemicals that lacked physico-chemical information. In these cases, a proxy chemical of similar structure was used that may over- or under-estimate the PRG for soils.

Equation 4-9 forms the basis for deriving generic soil PRGs for the inhalation pathway. The following parameters in the standardized equation can be replaced with specific site data to develop a simple site-specific PRG

- Source area
- Average soil moisture content
- Average fraction organic carbon content
- Dry soil bulk density

The basic principle of the VF_s model (Henry's law) is applicable only if the soil contaminant concentration is at or below soil saturation "sat". Above the soil saturation limit, the model

cannot predict an accurate VF-based PRG. How these particular cases are handled, depends on whether the contaminant is liquid or solid at ambient soil temperatures (see Section 4.5).

Particulate Emission Factor for Soils

Inhalation of chemicals adsorbed to respirable particles (PM_{10}) were assessed using a default PEF equal to 1. 316 x 10^9 m^3/kg that relates the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust emissions from contaminated soils. The generic PEF was derived using default values in Equation 4-11, which corresponds to a receptor point concentration of approximately 0.76 ug/m^3. The relationship is derived by Cowherd (1985) for a rapid assessment procedure applicable to a typical hazardous waste site where the surface contamination provides a relatively continuous and constant potential for emission over an extended period of time (e.g. years). This represents an annual average emission rate based on wind erosion that should be compared with chronic health criteria; it is not appropriate for evaluating the potential for more acute exposures.

The impact of the PEF on the resultant PRG concentration (that combines soil exposure pathways for ingestion, skin contact, and inhalation) can be assessed by accessing the Region 9 PRG website and viewing the pathway-specific soil concentrations. Equation 4-11 forms the basis for deriving a generic PEF for the inhalation pathway. For more details regarding specific parameters used in the PEF model, the reader is referred to *Soil Screening Guidance: Technical Background Document* (USEPA 1996a).

Note: the generic PEF evaluates windborne emissions and does not consider dust emissions from traffic or other forms of mechanical disturbance that could lead to greater emissions than assumed here.

4.3 Soils - Dermal Exposure

Dermal Contact Assumptions

Since the 1998 PRG table was issued, exposure factors for dermal contact with soil have changed in a few cases (USEPA 2000a). Recommended RME (reasonable maximum exposure) defaults for adult workers' skin surface areas (3300 cm^2/day) and soil adherence factors (0.2 mg/cm^2) now differ from the defaults recommended for adult residents (5700 cm^2/day, 0.07 mg/cm^2) as noted in Exhibit 4-1. This is due to differences in the range of activities experienced by workers versus residents.

Dermal Absorption

Chemical-specific skin absorption values recommended by the Superfund Dermal Workgroup were applied when available. Chemical-specific values are included for the following chemicals: arsenic, cadmium, chlordane, 2,4-D, DDT, lindane, TCDD, PAHs, PCBs, and pentachlorophenols.

The recently issued "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance" (USEPA 2000a) recommends a default dermal absorption factor for semivolatile organic compounds of 10% as a screening method for the majority of SVOCs without dermal

absorption factors. Default dermal absorption values for other chemicals (VOCs and inorganics) are not recommended in the new guidance. Therefore, the assumption of 1% for inorganics and 10% for volatiles is no longer included in the Region 9 PRG table. This change has minimal impact on the final risk-based calculations because human exposure to VOCs and inorganics in soils is generally driven by other pathways of exposure.

4.4 Soils - Migration to Groundwater

The methodology for calculating SSLs for the migration to groundwater was developed to identify chemical concentrations in soil that have the potential to contaminate groundwater. Migration of contaminants from soil to groundwater can be envisioned as a two-stage process: (1) release of contaminant in soil leachate and (2) transport of the contaminant through the underlying soil and aquifer to a receptor well. The SSL methodology considers both of these fate and transport mechanisms.

SSLs are backcalculated from acceptable ground water concentrations (i.e. nonzero MCLGs, MCLs, or risk-based PRGs). First, the acceptable groundwater concentration is multiplied by a dilution factor to obtain a target leachate concentration. For example, if the dilution factor is 10 and the acceptable ground water concentration is 0.05 mg/L, the target soil leachate concentration would be 0.5 mg/L. The partition equation (presented in the *Soil Screening Guidance* document) is then used to calculate the total soil concentration (i.e. SSL) corresponding to this soil leachate concentration.

The SSL methodology was designed for use during the early stages of a site evaluation when information about subsurface conditions may be limited. Because of this constraint, the methodology is based on conservative, simplifying assumptions about the release and transport of contaminants in the subsurface. For more on SSLs, and how to calculate site-specific SSLs versus generic SSLs presented in the PRG table, the reader is referred to the *Soil Screening Guidance* document (USEPA 1996a,b).

4.5 Soil Saturation Limit

The soil saturation concentration "sat" corresponds to the contaminant concentration in soil at which the absorptive limits of the soil particles, the solubility limits of the soil pore water, and saturation of soil pore air have been reached. Above this concentration, the soil contaminant may be present in free phase, i.e., nonaqueous phase liquids (NAPLs) for contaminants that are liquid at ambient soil temperatures and pure solid phases for compounds that are solid at ambient soil temperatures.

Equation 4-10 is used to calculate "sat" for each volatile contaminant. As an update to RAGS HHEM, Part B (USEPA 1991a), this equation takes into account the amount of contaminant that is in the vapor phase in soil in addition to the amount dissolved in the soil's pore water and sorbed to soil particles.

Chemical-specific "sat" concentrations must be compared with each VF-based PRG because a basic principle of the PRG volatilization model is not applicable when free-phase contaminants are present. How these cases are handled depends on whether the contaminant is liquid or solid at ambient temperatures. Liquid contaminant that have a VF-based PRG that exceeds the "sat" concentration are set equal to "sat" whereas for solids (e.g., PAHs), soil screening decisions are

based on the appropriate PRGs for other pathways of concern at the site (e.g., ingestion).

4.6 Ground Water/Surface Water - Ingestion and Inhalation

Calculation of PRGs for ingestion and inhalation of contaminants in domestic water is based on the methodology presented in RAGS HHEM, Part B (USEPA 1991a). Ingestion of drinking water is an appropriate pathway for all chemicals. For the purposes of this guidance, however, inhalation of volatile chemicals from water is considered routinely only for chemicals with a Henry's Law constant of 1×10^{-5} atm-m^3/mole or greater and with a molecular weight of less than 200 g/mole.

For volatile chemicals, an upperbound volatilization constant (VF_w) is used that is based on all uses of household water (e.g showering, laundering, and dish washing). Certain assumptions were made. For example, it is assumed that the volume of water used in a residence for a family of four is 720 L/day, the volume of the dwelling is 150,000 L and the air exchange rate is 0.25 air changes/hour (Andelman in RAGS Part B). Furthermore, it is assumed that the average transfer efficiency weighted by water use is 50 percent (i.e. half of the concentration of each chemical in water will be transferred into air by all water uses). Note: the range of transfer efficiencies extends from 30% for toilets to 90% for dishwashers.

4.7 Default Exposure Factors

Default exposure factors were obtained primarily from RAGS Supplemental Guidance Standard Default *Exposure Factors* (OSWER Directive, 9285.6-03) dated March 25, 1991 and more recent information from U.S. EPA's Office of Solid Waste and Emergency Response, U.S. EPA's Office of Research and Development, and California EPA's Department of Toxic Substances Control (see Exhibit 4-1).

Because contact rates may be different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age-adjusted factors ("adj"). Use of age-adjusted factors are especially important for soil ingestion exposures, which are higher during childhood and decrease with age. However, for purposes of combining exposures across pathways, additional age-adjusted factors are used for inhalation and dermal exposures. These factors approximate the integrated exposure from birth until age 30 combining contact rates, body weights, and exposure durations for two age groups - small children and adults. Age-adjusted factors were obtained from RAGS PART B or developed by analogy (see derivations next page).

For soils only, noncarcinogenic contaminants are evaluated in children separately from adults. No age-adjustment factor is used in this case. The focus on children is considered protective of the higher daily intake rates of soil by children and their lower body weight. For maintaining consistency when evaluating soils, dermal and inhalation exposures are also based on childhood contact rates.

(1) ingestion([mg-yr]/[kg-d]:

$$IFS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_r - ED_c) \times IRS_a}{BW_a}$$

(2) skin contact([mg-yr]/[kg-d]:

$$SFS_{adj} = \frac{ED_c \times AF \times SA_c}{BW_c} + \frac{(ED_r - ED_c) \times AF \times SA_a}{BW_a}$$

(3) inhalation ([m^3-yr]/[kg-d]):

$$InhF_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_r - ED_c) \times IRA_a}{BW_a}$$

EXHIBIT 4-1
STANDARD DEFAULT FACTORS

Symbol	Definition (units)	Default	Reference
CSFo	Cancer slope factor oral (mg/kg-d)-1	–	IRIS, HEAST, or NCEA
CSFi	Cancer slope factor inhaled (mg/kg-d)-1	–	IRIS, HEAST, or NCEA
RfDo	Reference dose oral (mg/kg-d)	–	IRIS, HEAST, or NCEA
RfDi	Reference dose inhaled (mg/kg-d)	–	IRIS, HEAST, or NCEA
TR	Target cancer risk	10^{-6}	--
THQ	Target hazard quotient	1	--
BWa	Body weight, adult (kg)	70	RAGS (Part A), EPA 1989 (EPA/540/1-89/002)
BWc	Body weight, child (kg)	15	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
ATc	Averaging time - carcinogens (days)	25550	RAGS(Part A), EPA 1989 (EPA/540/1-89/002)
ATn	Averaging time - noncarcinogens (days)	ED*365	
SAa	Exposed surface area for soil/dust (cm^2/day)		Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
	– adult resident	5700	
	– adult worker	3300	
SAc	Exposed surface area, child in soil (cm^2/day)	2800	Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
AFa	Adherence factor, soils (mg/cm^2)		Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
	– adult resident	0.07	
	– adult worker	0.2	
AFc	Adherence factor, child (mg/cm^2)	0.2	Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
ABS	Skin absorption defaults (unitless):		
	– semi-volatile organics	0.1	Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
	– volatile organics	–	Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
	– inorganics	–	Dermal Assessment, EPA 2000 (EPA/540/R-99/005)
IRAa	Inhalation rate - adult (m^3/day)	20	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
IRAc	Inhalation rate - child (m^3/day)	10	Exposure Factors, EPA 1997 (EPA/600/P-95/002Fa)
IRWa	Drinking water ingestion - adult (L/day	2	RAGS(Part A), EPA 1989 (EPA/540/1-89/002)
IRWc	Drinking water ingestion - child (L/day)	1	PEA, Cal-EPA (DTSC, 1994)
IRSa	Soil ingestion - adult (mg/day)	100	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
IRSc	Soil ingestion - child (mg/day),	200	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
IRSo	Soil ingestion - occupational (mg/day)	50	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
EFr	Exposure frequency - residential (d/y)	350	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
EFo	Exposure frequency - occupational (d/y)	250	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
EDr	Exposure duration - residential (years)	30[a]	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
EDc	Exposure duration - child (years)	6	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
EDo	Exposure duration - occupational (years)	25	Exposure Factors, EPA 1991 (OSWER No. 9285.6-03)
	Age-adjusted factors for carcinogens:		
IFSadj	Ingestion factor, soils ([mg-yr]/[kg-d])	114	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
SFSadj	Dermal factor, soils ([mg-yr]/[kg-d])	361	By analogy to RAGS (Part B)
InhFadj	Inhalation factor, air ([m^3-yr]/[kg-d])	11	By analogy to RAGS (Part B)
IFWadj	Ingestion factor, water ([L-yr]/[kg-d])	1.1	By analogy to RAGS (Part B)
VFw	Volatilization factor for water (L/m^3)	0.5	RAGS(Part B), EPA 1991 (OSWER No. 9285.7-01B)
PEF	Particulate emission factor (m^3/kg)	See below	Soil Screening Guidance (EPA 1996a,b)
VFs	Volatilization factor for soil (m^3/kg)	See below	Soil Screening Guidance (EPA 1996a,b)
sat	Soil saturation concentration (mg/kg)	See below	Soil Screening Guidance (EPA 1996a,b)

Footnote:
[a]Exposure duration for lifetime residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years) .

4.8 Standardized Equations

The equations used to calculate the PRGs for carcinogenic and noncarcinogenic contaminants are presented in Equations 4-1 through 4-8. The PRG equations update RAGS Part B equations. The methodology backcalculates a soil, air, or water concentration level from a target risk (for carcinogens) or hazard quotient (for noncarcinogens). For completeness, the soil equations combine risks from ingestion, skin contact, and inhalation simultaneously. Note: the electronic version of the table also includes pathway-specific PRGs, should the user decide against combining specific exposure pathways; or, the user wants to identify the relative contribution of each pathway to exposure.

To calculate PRGs for volatile chemicals in soil, a chemical-specific volatilization factor is calculated per Equation 4-9. Because of its reliance on Henry's law, the VF_s model is applicable only when the contaminant concentration in soil is at or below saturation (i.e. there is no free-phase contaminant present). Soil saturation ("sat") corresponds to the contaminant concentration in soil at which the adsorptive limits of the soil particles and the solubility limits of the available soil moisture have been reached. Above this point, pure liquid-phase contaminant is expected in the soil. If the PRG calculated using VF_s was greater than the calculated sat, the PRG was set equal to sat, in accordance with *Soil Screening Guidance* (USEPA 1996 a,b). The equation for deriving sat is presented in Equation 4-10.

PRG EQUATIONS

Soil Equations: For soils, equations were based on three exposure routes (ingestion, skin contact, and inhalation).

Equation 4-1: Combined Exposures to Carcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{TR \times AT_c}{EF_r \left[\left(\frac{IFS_{adj} \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{SFS_{adj} \times ABS \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{InhF_{adj} \times CSF_i}{VF_s^a} \right) \right]}$$

Equation 4-2: Combined Exposures to Noncarcinogenic Contaminants in Residential Soil

$$C(mg/kg) = \frac{THQ \times BW_c \times AT_n}{EF_r \times ED_c \left[\left(\frac{1}{RfD_o} \times \frac{IRS_c}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_o} \times \frac{SA_c \times AF \times ABS}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_i} \times \frac{IRA_c}{VF_s^a} \right) \right]}$$

Equation 4-3: Combined Exposures to Carcinogenic Contaminants in Industrial Soil

$$C(mg/kg) = \frac{TR \times BW_a \times AT_c}{EF_o \times ED_o \left[\left(\frac{IRS_o \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{SA_a \times AF \times ABS \times CSF_o}{10^6 mg/kg} \right) + \left(\frac{IRA_a \times CSF_i}{VF_s^a} \right) \right]}$$

Footnote:

[a]Use VF_s for volatile chemicals (defined as having a Henry's Law Constant [atm-m^3/mol] greater than 10^{-5} and a molecular weight less than 200 grams/mol) or PEF for non-volatile chemicals.

$$C(mg/kg) = \frac{THQ \times BW_a \times AT_n}{EF_o \times ED_o \left[\left(\frac{1}{RfD_o} \times \frac{IRS_o}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_o} \times \frac{SA_a \times AF \times ABS}{10^6 mg/kg} \right) + \left(\frac{1}{RfD_i} \times \frac{IRA_a}{VF_s^a} \right) \right]}$$

Equation 4-4: Combined Exposures to Noncarcinogenic Contaminants in Industrial Soil

Tap Water Equations:

Equation 4-5: Ingestion and Inhalation Exposures to Carcinogenic Contaminants in Water

$$C(ug/L) = \frac{TR \times AT_c \times 1000 ug/mg}{EF_r \left[\left(IFW_{adj} \times CSF_o \right) + \left(VF_w \times InhF_{adj} \times CSF_i \right) \right]}$$

Equation 4-6: Ingestion and Inhalation Exposures to Noncarcinogenic Contaminants in Water

$$C(ug/L) = \frac{THQ \times BW_a \times AT_n \times 1000 ug/mg}{EF_r \times ED_r \left[\left(\frac{IRW_a}{RfD_o} \right) + \left(\frac{VF_w \times IRA_a}{RfD_i} \right) \right]}$$

Air Equations:

Equation 4-7: Inhalation Exposures to Carcinogenic Contaminants in Air

$$C(ug/m^3) = \frac{TR \times AT_c \times 1000 ug/mg}{EF_r \times InhF_{adj} \times CSF_i}$$

Equation 4-8: Inhalation Exposures to Noncarcinogenic Contaminants in Air

$$C(ug/m^3) = \frac{THQ \times RfD_i \times BW_a \times AT_n \times 1000 ug/mg}{EF_r \times ED_r \times IRA_a}$$

Footnote:
[a]Use VF_s for volatile chemicals (defined as having a Henry's Law Constant [atm-m^3/mol] greater than 10^{-5} and a molecular weight less than 200 grams/mol) or PEF for non-volatile chemicals.

SOIL-TO-AIR VOLATILIZATION FACTOR (VF_s)

Equation 4-9: Derivation of the Volatilization Factor

$$VF_s\,(m^3/kg) = (Q/C) \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times \rho_b \times D_A)} \times 10^{-4}\,(m^2/cm^2)$$

where:

$$D_A = \frac{[\,(\Theta_a^{10/3} D_i H' + \Theta_w^{10/3} D_w)/n^2]}{\rho_B K_d + \Theta_w + \Theta_a H'}$$

Parameter	Definition (units)	Default
VF_s	Volatilization factor (m^3/kg)	--
D_A	Apparent diffusivity (cm^2/s)	--
Q/C	Inverse of the mean conc. at the center of a 0.5-acre square source (g/m^2-s per kg/m^3)	68.81
T	Exposure interval (s)	9.5×10^8
ρ_b	Dry soil bulk density (g/cm^3)	1.5
Θ_a	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n-Θ_w
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (ρ_b/ρ_s)
Θ_w	Water-filled soil porosity (L_{water}/L_{soil})	0.15
ρ_s	Soil particle density (g/cm^3)	2.65
Di	Diffusivity in air (cm^2/s)	Chemical-specific
H	Henry's Law constant (atm-m^3/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	Calculated from H by multiplying by 41 (USEPA 1991a)
D_w	Diffusivity in water (cm^2/s)	Chemical-specific
K_d	Soil-water partition coefficient (cm^3/g) = $K_{oc}f_{oc}$	Chemical-specific
K_{oc}	Soil organic carbon-water partition coefficient (cm^3/g)	Chemical-specific
f_{oc}	Fraction organic carbon in soil (g/g)	0.006 (0.6%)

SOIL SATURATION CONCENTRATION (sat)

Equation 4-10: Derivation of the Soil Saturation Limit

$$sat = \frac{S}{\rho_b} (K_d \rho_b + \Theta_w + H' \Theta_a)$$

Parameter	Definition (units)	Default
sat	Soil saturation concentration (mg/kg)	--
S	Solubility in water (mg/L-water)	Chemical-specific
ρ_b	Dry soil bulk density (kg/L)	1.5
n	Total soil porosity (L_{pore}/L_{soil})	0.43 or 1 - (ρ_b/ρ_s)
ρ_s	Soil particle density (kg/L)	2.65
K_d	Soil-water partition coefficient (L/kg)	K_{oc} x f_{oc} (chemical-specific)
k_{oc}	Soil organic carbon/water partition coefficient (L/kg)	Chemical-specific
f_{oc}	Fraction organic carbon content of soil (g/g)	0.006 or site-specific
Θ_w	Water-filled soil porosity (L_{water}/L_{soil})	0.15
Θ_a	Air filled soil porosity (L_{air}/L_{soil})	0.28 or n-Θ_w
w	Average soil moisture content (kg_{water}/kg_{soil} or L_{water}/kg_{soil})	0.1
H	Henry's Law constant (atm-m^3/mol)	Chemical-specific
H'	Dimensionless Henry's Law constant	H x 41, where 41 is a units conversion factor

SOIL-TO-AIR PARTICULATE EMISSION FACTOR (PEF)

Equation 4-11: Derivation of the Particulate Emission Factor

$$PEF(m^3/kg) = Q/C \times \frac{3600 s/h}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$$

Parameter	Definition (units)	Default
PEF	Particulate emission factor (m^3/kg)	1.316×10^9
Q/C	Inverse of the mean concentration at the center of a 0.5-acre-square source (g/m^2-s per kg/m^3)	90.80
V	Fraction of vegetative cover (unitless)	0.5
U_m	Mean annual windspeed (m/s)	4.69
U_t	Equivalent threshold value of windspeed at 7 m (m/s)	11.32
F(x)	Function dependent on U_m/U_t derived using Cowherd (1985) (unitless)	0.194

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Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
							V O C	skin abs. soils											Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)			CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
8.7E-03	i	4.0E-03	i	8.7E-03	r	4.0E-03	r	0	30560-19-1	Acephate	5.6E+01	ca**	2.8E+02	ca*	7.7E-01	ca*	7.7E+00	ca*		
				7.7E-03	i	2.6E-03	i	1	75-07-0	Acetaldehyde	1.1E+01	ca**	2.3E+01	ca**	8.7E-01	ca*	1.7E+00	ca		
		2.0E-02	r			2.0E-02	r	0 0.1	34256-82-1	Acetochlor	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	i			1.0E-01	r	1	67-64-1	Acetone	1.6E+03	nc	6.2E+03	nc	3.7E+02	nc	6.1E+02	nc	1.6E+01	8.0E-01
		8.0E-04	h			8.0E-04	r	0 0.1	75-86-5	Acetone cyanohydrin	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
		6.0E-03	x			1.7E-02	i	1	75-05-8	Acetonitrile	2.7E+02	nc	1.7E+03	nc	6.2E+01	nc	7.9E+01	nc		
		1.0E-01	i			5.7E-06	x	1	98-86-2	Acetophenone	4.9E-01	nc	1.6E+00	nc	2.1E-02	nc	4.2E-02	nc		
1.1E-01	o	1.3E-02	i	1.1E-01	r	1.3E-02	r	0 0.1	50594-66-6	Acifluorfen	4.4E+00	ca	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
		2.0E-02	h			5.7E-06	i	1	107-02-8	Acrolein	1.0E-01	nc	3.4E-01	nc	2.1E-02	nc	4.2E-02	nc		
4.6E+00	i	2.0E-04	i	4.6E+00	i	2.0E-04	r	0 0.1	79-06-1	Acrylamide	1.1E-01	ca	5.4E-01	ca	1.5E-03	ca	1.5E-02	ca		
		5.0E-01	i			2.9E-04	i	0 0.1	79-10-7	Acrylic acid	2.9E+04	nc	1.0E+05	max	1.0E+00	nc	1.8E+04	nc		
5.4E-01	i	1.0E-03	h	2.4E-01	i	5.7E-04	i	1	107-13-1	Acrylonitrile	2.1E-01	ca*	5.1E-01	ca*	2.8E-02	ca*	3.9E-02	ca*		
8.1E-02	h	1.0E-02	i	8.0E-02	r	1.0E-02	r	0 0.1	15972-60-8	Alachlor	6.0E+00	ca	3.1E+01	ca	8.4E-02	ca	8.4E-01	ca		
		1.5E-01	i			1.5E-01	r	0 0.1	1596-84-5	Alar	9.2E+03	nc	1.0E+05	max	5.5E+02	nc	5.5E+03	nc		
		1.0E-03	i			1.0E-03	r	0 0.1	116-06-3	Aldicarb	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E-03	i			1.0E-03	r	0 0.1	1646-88-4	Aldicarb sulfone	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
1.7E+01	i	3.0E-05	i	1.7E+01	i	3.0E-05	r	0 0.1	309-00-2	Aldrin	2.9E-02	ca*	1.5E-01	ca	3.9E-04	ca	4.0E-03	ca	5.0E-01	2.0E-02
		2.5E-01	i			2.5E-01	r	0 0.1	5585-64-8	Ally	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		5.0E-03	i			5.0E-03	r	0 0.1	107-18-6	Allyl alcohol	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		5.0E-02	x			2.9E-04	i	0 0.1	107-05-1	Allyl chloride	3.0E+03	nc	4.3E+04	nc	1.0E+00	nc	1.8E+03	nc		
		1.0E+00	n			1.4E-03	n	0	7429-90-5	Aluminum	7.6E+04	nc	1.0E+05	max	5.1E+00	nc	3.6E+04	nc		
		4.0E-04	i					0	20859-73-8	Aluminum phosphide	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc		
		3.0E-04	i			3.0E-04	r	0 0.1	67485-29-4	Amdro	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		9.0E-03	i			9.0E-03	r	0 0.1	834-12-8	Ametryn	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
		7.0E-02	h			7.0E-02	r	0 0.1	591-27-5	m-Aminophenol	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
		2.0E-05	h			2.0E-05	r	0 0.1	504-24-5	4-Aminopyridine	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
		2.5E-03	i			2.5E-03	r	0 0.1	33089-61-1	Amitraz	1.5E+02	nc	2.2E+03	nc	9.1E+00	nc	9.1E+01	nc		
						2.9E-02	i		7664-41-7	Ammonia					1.0E+02	nc				
		2.0E-01	i					0 0.1	7773-06-0	Ammonium sulfamate	1.2E+04	nc	1.0E+05	max			7.3E+03	nc		
5.7E-03	i	7.0E-03	n	5.7E-03	r	2.9E-04	i	0 0.1	62-53-3	Aniline	8.5E+01	ca**	4.3E+02	ca*	1.0E+00	nc	1.2E+01	ca*		
		4.0E-04	i					0	7440-36-0	Antimony and compounds	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc	5.0E+00	3.0E-01
		5.0E-04	h					0	1314-60-9	Antimony pentoxide	3.9E+01	nc	1.0E+03	nc			1.8E+01	nc		
		9.0E-04	h					0	28300-74-5	Antimony potassium tartrate	7.0E+01	nc	1.8E+03	nc			3.3E+01	nc		
		4.0E-04	h					0	1332-81-6	Antimony tetroxide	3.1E+01	nc	8.2E+02	nc			1.5E+01	nc		
		4.0E-04	h			5.7E-05	i	0	1309-64-4	Antimony trioxide	3.1E+01	nc	8.2E+02	nc	2.1E-01	nc	1.5E+01	nc		
		1.3E-02	i			1.3E-02	r	0 0.1	74115-24-5	Apollo	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
2.5E-02	i	5.0E-02	h	2.5E-02	i	5.0E-02	r	0 0.1	140-57-8	Aramite	1.9E+01	ca	9.9E+01	ca	2.7E-01	ca	2.7E+00	ca		
		3.0E-04	i					0 0.03	7440-38-2	Arsenic (noncancer endpoint)	2.2E+01	nc	4.4E+02	nc						
1.5E+00	i	3.0E-04	i	1.5E+01	i			0 0.03	7440-38-2	Arsenic (cancer endpoint)	3.9E-01	ca*	2.7E+00	ca	4.5E-04	ca	4.5E-02	ca	2.9E+01	1.0E+00
						1.4E-05	r	0	7784-42-1	Arsine (see arsenic for cancer endpoint)					5.2E-02	nc				
		9.0E-03	i			9.0E-03	i	0.1	76578-12-6	Assure	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
		5.0E-02	i			5.0E-02	r	0 0.1	3337-71-1	Asulam	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
2.2E-01	h	3.5E-02	h	2.2E-01	r	3.5E-02	r	0 0.1	1912-24-9	Atrazine	2.2E+00	ca	1.1E+01	ca	3.1E-02	ca	3.0E-01	ca		
		4.0E-04	i			4.0E-04	r	0 0.1	71751-41-2	Avermectin B1	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
1.1E-01	i			1.1E-01	i			0 0.1	103-33-3	Azobenzene	4.4E+00	ca	2.2E+01	ca	6.2E-02	ca	6.1E-01	ca		
		7.0E-02	i			1.4E-04	h	0	7440-39-3	Barium and compounds	5.4E+03	nc	1.0E+05	max	5.2E-01	nc	2.6E+03	nc	1.6E+03	8.2E+01
		4.0E-03	i			4.0E-03	r	0 0.1	114-26-1	Baygon	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		3.0E-02	i			3.0E-02	r	0 0.1	43121-43-3	Bayleton	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0 0.1	68359-37-5	Baythroid	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-01	i			3.0E-01	r	0 0.1	1861-40-1	Benefin	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		5.0E-02	i			5.0E-02	r	0 0.1	17804-35-2	Benomyl	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		3.0E-02	i			3.0E-02	r	0 0.1	25057-89-0	Bentazon	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		1.0E-01	i			1.0E-01	r	0 0.1	100-52-7	Benzaldehyde	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
5.5E-02	i	3.0E-03	n	2.7E-02	i	1.7E-03	n	1	71-43-2	Benzene	6.5E-01	ca*	1.5E+00	ca*	2.5E-01	ca*	3.5E-01	ca*	3.0E-02	2.0E-03

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

CONTAMINANT	TOXICITY INFORMATION									PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
	SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.	Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
Benzidine	2.3E+02	i	3.0E-03	i	2.3E+02	i	3.0E-03	r	0 0.1	92-87-5	2.1E-03	ca	1.1E-02	ca	2.9E-05	ca	2.9E-04	ca		
Benzoic acid			4.0E+00	i			4.0E+00	r	0 0.1	65-85-0	1.0E+05	max	1.0E+05	max	1.5E+04	nc	1.5E+05	nc	4.0E+02	2.0E+01
Benzotrichloride	1.3E+01	i			1.3E+01	r			0 0.1	98-07-7	3.7E-02	ca	1.9E-01	ca	5.2E-04	ca	5.2E-03	ca		
Benzyl alcohol			3.0E-01	h			3.0E-01	r	0 0.1	100-51-6	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
Benzyl chloride	1.7E-01	i			1.7E-01	r			1	100-44-7	8.9E-01	ca	2.3E+00	ca	4.0E-02	ca	6.6E-02	ca		
Beryllium and compounds			2.0E-03	i	8.4E+00	i	5.7E-06	i	0	7440-41-7	1.5E+02	nc	2.2E+03	ca**	8.0E-04	ca*	7.3E+01	nc	6.3E+01	3.0E+00
Bidrin			1.0E-04	i			1.0E-04	r	0 0.1	141-66-2	6.1E+00	nc	8.8E+01	nc	3.7E-01	nc	3.6E+00	nc		
Biphenthrin (Talstar)			1.5E-02	i			1.5E-02	r	0 0.1	82657-04-3	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
1,1-Biphenyl			5.0E-02	i			5.0E-02	r	1	92-52-4	3.5E+02	sat	3.5E+02	sat	1.8E+02	nc	3.0E+02	nc		
Bis(2-chloroethyl)ether	1.1E+00	i			1.2E+00	i			1	111-44-4	2.1E-01	ca	6.2E-01	ca	5.8E-03	ca	9.8E-03	ca	4.0E-04	2.0E-05
Bis(2-chloroisopropyl)ether	7.0E-02	h	4.0E-02	i	3.5E-02	h	4.0E-02	r	1	108-60-1	2.9E+00	ca	8.1E+00	ca	1.9E-01	ca	2.7E-01	ca		
Bis(chloromethyl)ether	2.2E+02	i			2.2E+02	i			1	542-88-1	1.9E-04	ca	4.4E-04	ca	3.1E-05	ca	5.2E-05	ca		
Bis(2-chloro-1-methylethyl)ether	7.0E-02	h	4.0E-02	i	3.5E-02	h	4.0E-02	r	1	108-60-1	2.9E+00	ca	8.1E+00	ca	1.9E-01	ca	2.7E-01	ca		
Bis(2-ethylhexyl)phthalate (DEHP)	1.4E-02	i	2.0E-02	i	1.4E-02	r	2.2E-02	r	0 0.1	117-81-7	3.5E+01	ca*	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
Bisphenol A			5.0E-02	i			5.0E-02	r	0 0.1	80-05-7	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
Boron			9.0E-02	i			5.7E-03	h	0 0.1	7440-42-8	5.5E+03	nc	7.9E+04	nc	2.1E+01	nc	3.3E+03	nc		
Boron trifluoride							2.0E-04	h	0 0.1	7637-07-2					7.3E-01	nc				
Bromobenzene			2.0E-02	n			2.9E-03	n	1	108-86-1	2.8E+01	nc	9.2E+01	nc	1.0E+01	nc	2.0E+01	nc		
Bromodichloromethane	6.2E-02	i	2.0E-02	i	6.2E-02	r	2.0E-02	r	1	75-27-4	1.0E+00	ca	2.4E+00	ca	1.1E-01	ca	1.8E-01	ca	6.0E-01	3.0E-02
Bromoform (tribromomethane)	7.9E-03	i	2.0E-02	i	3.9E-03	i	2.0E-02	r	0 0.1	75-25-2	6.2E+01	ca*	3.1E+02	ca*	1.7E+00	ca*	8.5E+00	ca*	8.0E-01	4.0E-02
Bromomethane (Methyl bromide)			1.4E-03	i			1.4E-03	i	1	74-83-9	3.9E+00	nc	1.3E+01	nc	5.2E+00	nc	8.7E+00	nc	2.0E-01	1.0E-02
4-Bromophenyl phenyl ether									0 0.1	101-55-3										
Bromophos			5.0E-03	h			5.0E-03	r	0 0.1	2104-96-3	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
Bromoxynil			2.0E-02	i			2.0E-02	r	0 0.1	1689-84-5	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
Bromoxynil octanoate			2.0E-02	i			2.0E-02	r	0 0.1	1689-99-2	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
1,3-Butadiene	1.8E+00	r			1.8E+00	i			1	106-99-0	3.5E-03	ca	7.6E-03	ca	3.7E-03	ca	6.2E-03	ca		
1-Butanol			1.0E-01	i			1.0E-01	r	0 0.1	71-36-3	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	1.7E+01	9.0E-01
Butylate			5.0E-02	i			5.0E-02	r	0 0.1	2008-41-5	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
n-Butylbenzene			1.0E-02	n			1.0E-02	r	1	104-51-8	1.4E+02	nc	2.4E+02	sat	3.7E+01	nc	6.1E+01	nc		
sec-Butylbenzene			1.0E-02	n			1.0E-02	r	1	135-98-8	1.1E+02	nc	2.2E+02	sat	3.7E+01	nc	6.1E+01	nc		
tert-Butylbenzene			1.0E-02	n			1.0E-02	r	1	98-06-6	1.3E+02	nc	3.9E+02	sat	3.7E+01	nc	6.1E+01	nc		
Butyl benzyl phthalate			2.0E-01	i			2.0E-01	r	0 0.1	85-68-7	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc	9.3E+02	8.1E+02
Butylphthalyl butylglycolate			1.0E+00	i			1.0E+00	r	0 0.1	85-70-1	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
Cacodylic acid			3.0E-03	h			3.0E-03	r	0 0.1	75-60-5	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
Cadmium and compounds			5.0E-04	i	6.3E+00	i			0 0.001	7440-43-9	3.7E+01	nc	8.1E+02	nc	1.1E-03	ca	1.8E+01	nc	8.0E+00	4.0E-01
"CAL-Modified PRG" (PEA, 1994)											9.0E+00									
Caprolactam			5.0E-01	i			5.0E-01	r	0 0.1	105-60-2	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
Captafol	8.6E-03	h	2.0E-03	i	8.6E-03	r	2.0E-03	r	0 0.1	2425-06-1	5.7E+01	ca**	2.9E+02	ca**	7.8E-01	ca**	7.8E+00	ca**		
Captan	3.5E-03	h	1.3E-01	i	3.5E-03	r	1.3E-01	r	0 0.1	133-06-2	1.4E+02	ca*	7.0E+02	ca	1.9E+00	ca	1.9E+01	ca		
Carbaryl			1.0E-01	i			1.1E-01	r	0 0.1	63-25-2	6.1E+03	nc	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc		
Carbazole	2.0E-02	h			2.0E-02	r			0 0.1	86-74-8	2.4E+01	ca	1.2E+02	ca	3.4E-01	ca	3.4E+00	ca	6.0E-01	3.0E-02
Carbofuran			5.0E-03	i			5.0E-03	r	0 0.1	1563-66-2	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
Carbon disulfide			1.0E-01	i			2.0E-01	i	1	75-15-0	3.6E+02	nc	7.2E+02	sat	7.3E+02	nc	1.0E+03	nc	3.2E+01	2.0E+00
Carbon tetrachloride	1.3E-01	i	7.0E-04	i	5.3E-02	i	7.0E-04	r	1	56-23-5	2.4E-01	ca**	5.3E-01	ca*	1.3E-01	ca*	1.7E-01	ca*	7.0E-02	3.0E-03
Carbosulfan			1.0E-02	i			1.0E-02	r	0 0.1	55285-14-8	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
Carboxin			1.0E-01	i			1.0E-01	r	0 0.1	5234-68-4	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
Chloramben			1.5E-02	i			1.5E-02	r	0 0.1	133-90-4	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
Chloranil	4.0E-01	h			4.0E-01	r			0 0.1	118-75-2	1.2E+00	ca	6.1E+00	ca	1.7E-02	ca	1.7E-01	ca		
Chlordane	3.5E-01	i	5.0E-04	i	3.5E-01	i	2.0E-04	i	0 0.04	12789-03-6	1.6E+00	ca*	1.1E+01	ca*	1.9E-02	ca*	1.9E-01	ca*	1.0E+01	5.0E-01
Chlorimuron-ethyl			2.0E-02	i			2.0E-02	r	0 0.1	90982-32-4	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
Chlorine			1.0E-01	i			5.7E-05	n		7782-50-5					2.1E-01	nc				
Chlorine dioxide							5.7E-05	i		10049-04-4					2.1E-01	nc				
Chloroacetaldehyde									1	107-20-0										
Chloroacetic acid			2.0E-03	h			2.0E-03	r	0 0.1	79-11-8	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION												CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
		8 6E-06	r			8 6E-06	i	1		532-27-4		2-Chloroacetophenone	3.3E-02	nc	1.1E-01	nc	3.1E-02	nc	5.2E-02	nc		
		4 0E-03	i			4 0E-03	r	0	0 1	106-47-8		4-Chloroaniline	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc	7.0E-01	3.0E-02
		2 0E-02	i			1 7E-02	n	1		108-90-7		Chlorobenzene	1.5E+02	nc	5.4E+02	nc	6.2E+01	nc	1.1E+02	nc	1.0E+00	7.0E-02
2 7E-01	h	2 0E-02	i	2 7E-01	h	2 0E-02	r	0	0 1	510-15-6		Chlorobenzilate	1.8E+00	ca	9.1E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2 0E-01	h			2 0E-01	r	0	0 1	74-11-3		p-Chlorobenzoic acid	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2 0E-02	h			2 0E-02	r	0	0 1	98-56-6		4-Chlorobenzotrifluoride	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2 0E-02	h			2 0E-03	h	1		126-99-8		2-Chloro-1,3-butadiene	3.6E+00	nc	1.2E+01	nc	7.3E+00	nc	1.4E+01	nc		
		4 0E-01	h			4 0E-01	r	1		109-69-3		1-Chlorobutane	4.8E+02	sat	4.8E+02	sat	1.5E+03	nc	2.4E+03	nc		
		1 4E+01	r			1 4E+01	i	1		75-68-3		1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02	sat	3.4E+02	sat	5.2E+04	nc	8.7E+04	nc		
		1 4E+01	r			1 4E+01	i	1		75-45-6		Chlorodifluoromethane	3.4E+02	sat	3.4E+02	sat	5.1E+04	nc	8.5E+04	nc		
2 9E-03	n	4 0E-01	n	2 9E-03	r	2 9E+00	i	1		75-00-3		Chloroethane	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
								1		110-75-8		2-Chloroethyl vinyl ether										
6 1E-03	i	1 0E-02	i	8 1E-02	i	8 6E-05	n	1		67-66-3		Chloroform	2.4E-01	ca**	5.2E-01	ca**	8.4E-02	ca**	1.6E-01	ca**	6.0E-01	3.0E-02
1 3E-02	h			6 3E-03	h	8 6E-02	n	1		74-87-3		Chloromethane	1.2E+00	ca	2.7E+00	ca	1.1E+00	ca	1.5E+00	ca		
5 8E-01	h			5 8E-01	r			0	0 1	95-69-2		4-Chloro-2-methylaniline	8.4E-01	ca	4.3E+00	ca	1.2E-02	ca	1.2E-01	ca		
4 6E-01	h			4 6E-01	r			0	0 1	3165-93-3		4-Chloro-2-methylaniline hydrochloride	1.1E+00	ca	5.4E+00	ca	1.5E-02	ca	1.5E-01	ca		
		8 0E-02	i			8 0E-02	r	1		91-58-7		beta-Chloronaphthalene	3.9E+03	nc	2.7E+04	nc	2.9E+02	nc	4.9E+02	nc		
2 5E-02	h			2 5E-02	r		r	1		88-73-3		o-Chloronitrobenzene	8.1E+00	ca	2.3E+01	ca	2.7E-01	ca	4.5E-01	ca		
1 8E-02	h			1 8E-02	r		r	1		100-00-5		p-Chloronitrobenzene	1.1E+01	ca	3.2E+01	ca	3.7E-01	ca	6.2E-01	ca		
		5 0E-03	i			5 0E-03	r	1		95-57-8		2-Chlorophenol	6.3E+01	nc	2.4E+02	nc	1.8E+01	nc	3.0E+01	nc	4.0E+00	2.0E-01
		2 9E-02	r			2 9E-02	h	1		75-29-6		2-Chloropropane	1.7E+02	nc	5.9E+02	nc	1.0E+02	nc	1.7E+02	nc		
1 1E-02	h	1 5E-02	i	1 1E-02	r	1 5E-02	r	0	0 1	1897-45-6		Chlorothalonil	4.4E+01	ca*	2.2E+02	ca*	6.1E-01	ca*	6.1E+00	ca*		
		2 0E-02	i			2 0E-02	r	1		95-49-8		o-Chlorotoluene	1.6E+02	nc	5.7E+02	nc	7.3E+01	nc	1.2E+02	nc		
		2 0E-01	i			2 0E-01	r	0	0 1	101-21-3		Chlorpropham	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		3 0E-03	i			3 0E-03	r	0	0 1	2921-88-2		Chlorpyrifos	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1 0E-02	h			1 0E-02	r	0	0 1	5598-13-0		Chlorpyrifos-methyl	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5 0E-02	i			5 0E-02	r	0	0 1	64902-72-3		Chlorsulfuron	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		8 0E-04	h			8 0E-04	r	0	0 1	60238-56-4		Chlorthiophos	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
				4 2E+01	i			0				Total Chromium (1:6 ratio Cr VI:Cr III)	2.1E+02	ca	4.5E+02	ca	1 6E-04	ca			3.8E+01	2.0E+00
		1 5E+00	i							16065-83-1		Chromium III	1.0E+05	max	1.0E+05	max	0.0E+00		5.5E+04	nc		
		3 0E-03	i	2 9E+02	i			0		18540-29-9		Chromium VI	3.0E+01	ca**	6.4E+01	ca	2.3E-05	ca	1.1E+02	nc	3.8E+01	2.0E+00
												"CAL-Modified PRG" (PEA, 1994)	2.0E-01						1.6E-01			
		6 0E-02	n							7440-48-4		Cobalt	4.7E+03	nc	1.0E+05	max			2.2E+03	nc		
				2 2E+00	i			0		8007-45-2		Coke Oven Emissions					3.1E-03	ca				
		3 7E-02	h					0		7440-50-8		Copper and compounds	2.9E+03	nc	7.6E+04	nc			1.4E+03	nc		
1 9E+00	h			1 9E+00	r			1		123-73-9		Crotonaldehyde	5.3E-03	ca	1.1E-02	ca	3.5E-03	ca	5.9E-03	ca		
		1 0E-01	i			1 1E-01	i	1		98-82-8		Cumene (isopropylbenzene)	1.6E+02	nc	5.2E+02	nc	4.0E+02	nc	6.6E+02	nc		
8 4E-01	h	2 0E-03	h	8 4E-01	r	2 0E-03	r	0	0 1	21725-46-2		Cyanazine	5.8E-01	ca	2.9E+00	ca	8.0E-03	ca	8.0E-02	ca		
		2 0E-02	i			8 6E-04	i	1		74-90-8		Cyanide and compounds	1.1E+01	nc	3.5E+01	nc	3.1E+00	nc	6.2E+00	nc		
		4 0E-02	i			4 0E-02	r	1		460-19-5		Cyanogen	1.3E+02	nc	4.3E+02	nc	1.5E+02	nc	2.4E+02	nc		
		9 0E-02	i			9 0E-02	r	1		506-68-3		Cyanogen bromide	2.9E+02	nc	9.7E+02	nc	3.3E+02	nc	5.5E+02	nc		
		5 0E-02	i			5 0E-02	r	1		506-77-4		Cyanogen chloride	1.6E+02	nc	5.4E+02	nc	1.8E+02	nc	3.0E+02	nc		
		5 7E+00	r			5 7E+00	n	1		110-82-7		Cyclohexane	1.4E+02	sat	1.4E+02	sat	2.1E+04	nc	3.5E+04	nc		
		5 0E+00	i			5 0E+00	r	0	0 1	108-94-1		Cyclohexanone	1.0E+05	max	1.0E+05	max	1.8E+04	nc	1.8E+05	nc		
		2 0E-01	i			2 0E-01	r	0	0 1	108-91-8		Cyclohexylamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		5 0E-03	i			5 0E-03	r	0	0 1	68085-85-8		Cyhalothrin/Karate	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		1 0E-02	i			1 0E-02	r	0	0 1	52315-07-8		Cypermethrin	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		7 5E-03	i			7 5E-03	r	0	0 1	66215-27-8		Cyromazine	4.6E+02	nc	6.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1 0E-02	i			1 0E-02	r	0	0 1	1861-32-1		Dacthal	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		3 0E-02	i			3 0E-02	r	0	0 1	75-99-0		Dalapon	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2 5E-02	i			2 5E-02	r	0	0 1	39515-41-8		Danitol	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
2 4E-01	i			2 4E-01	r			0	0 03	72-54-8		DDD	2.4E+00	ca	1.7E+01	ca	2.8E-02	ca	2.8E-01	ca	1.6E+01	8.0E-01
3 4E-01	i			3 4E-01	r			0	0 03	72-55-9		DDE	1.7E+00	ca	1.2E+01	ca	2.0E-02	ca	2.0E-01	ca	5.4E+01	3 0E+00
3 4E-01	i	5 0E-04	i	3 4E-01	i	5 0E-04	r	0	0 03	50-29-3		DDT	1.7E+00	ca*	1.2E+01	ca*	2.0E-02	ca*	2.0E-01	ca*	3.2E+01	2.0E+00

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1 0E-02	i			1 0E-02	r	0 01	1163-19-5	Decabromodiphenyl ether	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		4 0E-05	i			4 0E-05	r	0 01	8065-48-3	Demeton	2.4E+00	nc	3.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
6 1E-02	h			6 1E-02	r			0 01	2303-16-4	Diallate	8.0E+00	ca	4.0E+01	ca	1.1E-01	ca	1.1E+00	ca		
		9 0E-04	h			9 0E-04	r	0 01	333-41-5	Diazinon	5.5E+01	nc	7.9E+02	nc	3.3E+00	nc	3.3E+01	nc		
		4 0E-03	n			4 0E-03	r	1	132-64-9	Dibenzofuran	2.9E+02	nc	5.1E+03	nc	1.5E+01	nc	2.4E+01	nc		
		1 0E-02	i			1 0E-02	r	0 01	106-37-6	1,4-Dibromobenzene	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
8 4E-02	i	2 0E-02	i	8 4E-02	r	2 0E-02	r	1	124-48-1	Dibromochloromethane	1.1E+00	ca	2.7E+00	ca	8.0E-02	ca	1.3E-01	ca	4.0E-01	2.0E-02
1 4E+00	h	5 7E-05	r	2 4E-03	h	5 7E-05	i	1	96-12-8	1,2-Dibromo-3-chloropropane	4.5E-01	ca**	4.0E+00	ca**	2.1E-01	nc	4.8E-02	ca**		
										"CAL-Modified PRG" (PEA, 1994)	6.0E-02				9.6E-04		4.7E-03			
8 5E+01	i	5 7E-05	r	7.7E-01	i	5 7E-05	h	1	106-93-4	1,2-Dibromoethane	6.9E-03	ca	4.8E-02	ca*	8.7E-03	ca*	7.6E-04	ca		
		1 0E-01	i			1 0E-01	r	0 01	84-74-2	Dibutyl phthalate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	2.3E+03	2.7E+02
		3 0E-02	i			3 0E-02	r	0 01	1918-00-9	Dicamba		nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		9 0E-02	i			5 7E-02	h	1	95-50-1	1,2-Dichlorobenzene	3.7E+02	sat	3.7E+02	sat	2.1E+02	nc	3.7E+02	nc	1.7E+01	9.0E-01
		9 0E-04	n			9 0E-04	r	1	541-73-1	1,3-Dichlorobenzene	1 3E+01	nc	5.2E+01	nc	3.3E+00	nc	5.5E+00	nc		
2 4E-02	h	3 0E-02	n	2 2E-02	n	2 3E-01	i	1	106-46-7	1,4-Dichlorobenzene	3.4E+00	ca	8.1E+00	ca	3.1E-01	ca	5.0E-01	ca	2.0E+00	1.0E-01
4 5E-01	i			4 5E-01	r			0 01	91-94-1	3,3-Dichlorobenzidine	1.1E+00	ca	5.5E+00	ca	1.5E-02	ca	1.5E-01	ca	7.0E-03	3.0E-04
		3 0E-02	n			3 0E-02	r	0 01	90-98-2	**4,4'-Dichlorobenzophenone**	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
9 3E+00	r			9 3E+00	h			1	764-41-0	1,4-Dichloro-2-butene	7.9E-03	ca	1.8E-02	ca	7.2E-04	ca	1.2E-03	ca		
		2 0E-01	i			5 7E-02	h	1	75-71-8	Dichlorodifluoromethane	9.4E+01	nc	3.1E+02	nc	2.1E+02	nc	3.9E+02	nc		
		1 0E-01	h			1 4E-01	h	1	75-34-3	1,1-Dichloroethane	5.9E+02	nc	2.1E+03	nc	5.2E+02	nc	8.1E+02	nc	2.3E+01	1.0E+00
5 7E-03				5 7E-03				1		**"CAL-Modified PRG"**	3.3E+00	ca	7.1E+00	ca	1.2E+00	ca	2.0E+00	ca		
9 1E-02	i	3 0E-02	n	9 1E-02	i	1 4E-03	n	1	107-06-2	1,2-Dichloroethane (EDC)	3.5E-01	ca*	7.6E-01	ca*	7.4E-02	ca*	1.2E-01	ca*	2.0E-02	1.0E-03
6 0E-01	i	9 0E-03	i	1 8E-01	i	9 0E-03	r	1	75-35-4	1,1-Dichloroethylene	5.4E-02	ca	1.2E-01	ca	3.8E-02	ca	4.6E-02	ca	6 0E-02	3.0E-03
		1 0E-02	h			1 0E-02	r	1	156-59-2	1,2-Dichloroethylene (cis)	4.3E+01	nc	1.5E+02	nc	3.7E+01	nc	6.1E+01	nc	4.0E-01	2.0E-02
		2 0E-02	i			2 0E-02	r	1	156-60-5	1,2-Dichloroethylene (trans)	6.3E+01	nc	2.1E+02	nc	7.3E+01	nc	1.2E+02	nc	7.0E-01	3.0E-02
		3 0E-03	i			3 0E-03	r	0 01	120-83-2	2,4-Dichlorophenol	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc	1.0E+00	5.0E-02
		8 0E-03	i			8 0E-03	r	0 01	94-82-6	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		1 0E-02	i			1 0E-02	r	0 0.05	94-75-7	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.9E+02	nc	1.2E+04	nc	3.7E+01	nc	3.6E+02	nc		
6 8E-02	h	1 1E-03	r	6 8E-02	r	1 1E-03	i	1	78-87-5	1,2-Dichloropropane	3.5E-01	ca*	7.7E-01	ca*	9.9E-02	ca*	1.6E-01	ca*	3.0E-02	1.0E-03
1 0E-01	i	3 0E-02	i	1 4E-02	i	5 7E-03	i	1	542-75-6	**1,3-Dichloropropene**	7.0E-01	ca	1.6E+00	ca	4.8E-01	ca	4.0E-01	ca	4.0E-03	2.0E-04
		3 0E-03	i			3 0E-03	r	0 01	616-23-9	2,3-Dichloropropanol	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
2 9E-01	i	5 0E-04	i	2 9E-01	r	1 4E-04	i	0 01	62-73-7	Dichlorvos	1.7E+00	ca*	8.5E+00	ca*	2.3E-02	ca*	2.3E-01	ca*		
4 4E-01	x			4 4E-01	r			0 01	115-32-2	Dicofol	1.1E+00	ca	5.6E+00	ca	1.5E-02	ca	1.5E-01	ca		
		3 0E-02	h			5 7E-05	h	1	77-73-6	Dicyclopentadiene	5.4E-01	nc	1.8E+00	nc	2.1E-01	nc	4.2E-01	nc		
1 6E+01	i	5 0E-05	r	1 6E+01	i	5 0E-05	r	0 01	60-57-1	Dieldrin	3.0E-02	ca	1.5E-01	ca	4.2E-04	ca	4.2E-03	ca	4.0E-03	2.0E-04
		5 7E-03	r			5 7E-03	h	0 01	112-34-5	Diethylene glycol, monobutyl ether	3.5E+02	nc	5.0E+03	nc	2.1E+01	nc	2.1E+02	nc		
		2 0E+00	h			2 0E+00	r	0 01	111-90-0	Diethylene glycol, monoethyl ether	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		1 1E-02	h			1 1E-02	r	0 01	617-84-5	Diethylformamide	6.7E+02	nc	9.7E+03	nc	4.0E+01	nc	4.0E+02	nc		
1 2E-03	i	6 0E-01	i	1 2E-03	r	6 0E-01	r	0 01	103-23-1	Di(2-ethylhexyl)adipate	4.1E+02	ca	2.1E+03	ca	5.6E+00	ca	5.6E+01	ca		
		8 0E-01	i			8 0E-01	r	0 01	84-66-2	Diethyl phthalate	4.9E+04	nc	1.0E+05	max	2.9E+03	nc	2.9E+04	nc		
4 7E+03	h			4 7E+03	r			0 01	56-53-1	Diethylstilbestrol	1.0E-04	ca	5.2E-04	ca	1.4E-06	ca	1.4E-05	ca		
		8 0E-02	i			8 0E-02	r	0 01	43222-48-6	Difenzoquat (Avenge)	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2 0E-02	i			2 0E-02	r	0 01	35367-38-5	Diflubenzuron	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1 1E+01	r			1 1E+01	i	1	75-37-6	1,1-Difluoroethane					4.2E+04	nc	6.9E+04	nc		
		2 0E-02	n			2 0E-02	r	0 01	28553-12-0	**Diisononyl phthalate**	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		8 0E-02	i			8 0E-02	r	0 01	1445-75-6	Diisopropyl methylphosphonate	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2 0E-02	i			2 0E-02	r	0 01	55290-64-7	Dimethipin	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2 0E-04	i			2 0E-04	r	0 01	60-51-5	Dimethoate	1.2E+01	nc	1.8E+02	nc	7.3E-01	nc	7.3E+00	nc		
1 4E-02	h			1 4E-02	r			0 01	119-90-4	3,3'-Dimethoxybenzidine	3.5E+01	ca	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		5 7E-06	r			5 7E-06	x	1	124-40-3	Dimethylamine	6.7E-02	nc	2.5E-01	nc	2.1E-02	nc	3.5E-02	nc		
		2 0E-03	i			2 0E-03	r	0 01	121-69-7	N-N-Dimethylaniline	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
7 5E-01	h			7 5E-01	r			0 01	95-68-1	2,4-Dimethylaniline	6.5E-01	ca	3.3E+00	ca	9.0E-03	ca	9.0E-02	ca		
5 8E-01	h			5 8E-01	r			0 01	21436-96-4	2,4-Dimethylaniline hydrochloride	8.4E-01	ca	4.3E+00	ca	1.2E-02	ca	1.2E-01	ca		
9 2E+00	h			9 2E+00	r			0 01	119-93-7	3,3'-Dimethylbenzidine	5.3E-02	ca	2.7E-01	ca	7.3E-04	ca	7.3E-03	ca		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFI 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
2.6E+00	x			3.5E+00	x		0	0.1	57-14-7	1,1-Dimethylhydrazine	1.9E-01	ca	9.5E-01	ca	1.9E-03	ca	2.6E-02	ca		
3.7E+01	x			3.7E+01	x		0	0.1	540-73-8	1,2-Dimethylhydrazine	1.3E-02	ca	6.7E-02	ca	1.8E-04	ca	1.8E-03	ca		
		1.0E-01	h			8.6E-03	i	0	0.1	68-12-2	N,N-Dimethylformamide	6.1E+03	nc	8.8E+04	nc	3.1E+01	nc	3.6E+03	nc		
		1.0E-03	n			1.0E-03	r	0	0.1	122-09-8	Dimethylphenethylamine	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.0E-02	i			2.0E-02	r	0	0.1	105-67-9	2,4-Dimethylphenol	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc	9.0E+00	4.0E-01
		6.0E-04	i			6.0E-04	r	0	0.1	576-26-1	2,6-Dimethylphenol	3.7E+01	nc	5.3E+02	nc	2.2E+00	nc	2.2E+01	nc		
		1.0E-03	i			1.0E-03	r	0	0.1	95-65-8	3,4-Dimethylphenol	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E+01	x			1.0E+01	r	0	0.1	131-11-3	Dimethyl phthalate	1.0E+05	max	1.0E+05	max	3.7E+04	nc	3.6E+05	nc		
		1.0E-01	i			1.0E-01	r	0	0.1	120-61-6	Dimethyl terephthalate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-03	i			2.0E-03	r	0	0.1	131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		4.0E-04	h			4.0E-04	r	0	0.1	528-29-0	1,2-Dinitrobenzene	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		1.0E-04	i			1.0E-04	r	0	0.1	99-65-0	1,3-Dinitrobenzene	6.1E+00	nc	8.8E+01	nc	3.7E-01	nc	3.6E+00	nc		
		4.0E-04	h			4.0E-04	r	0	0.1	100-25-4	1,4-Dinitrobenzene	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		2.0E-03	i			2.0E-03	r	0	0.1	51-28-5	2,4-Dinitrophenol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc	3.0E-01	1.0E-02
6.8E-01	i			6.8E-01	r		0	0.1	25321-14-6	Dinitrotoluene mixture	7.2E-01	ca	3.6E+00	ca	9.9E-03	ca	9.9E-02	ca	8.0E-04	4.0E-05
		2.0E-03	i			2.0E-03	r	0	0.1	121-14-2	2,4-Dinitrotoluene (see Dinitrotoluene mixture)	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc	8.0E-04	4.0E-05
		1.0E-03	h			1.0E-03	r	0	0.1	606-20-2	2,6-Dinitrotoluene (see Dinitrotoluene mixture)	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc	7.0E-04	3.0E-05
		1.0E-03	i			1.0E-03	r	0	0.1	88-85-7	Dinoseb	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.0E-02	h			2.0E-02	r	0	0.1	117-84-0	di-n-Octyl phthalate	1.2E+03	nc	1.0E+04	sat	7.3E+01	nc	7.3E+02	nc	1.0E+04	1.0E+04
1.1E-02	i			1.1E-02	r		0	0.1	123-91-1	1,4-Dioxane	4.4E+01	ca	2.2E+02	ca	6.1E-01	ca	6.1E+00	ca		
1.5E+05	h			1.5E+05	h		0	0.03	1746-01-6	Dioxin (2,3,7,8-TCDD)	3.9E-06	ca	2.7E-05	ca	4.5E-08	ca	4.5E-07	ca		
		3.0E-02	i			3.0E-02	r	0	0.1	957-51-7	Diphenamid	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		2.5E-02	i			2.5E-02	r	0	0.1	122-39-4	Diphenylamine	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3.0E-04	n			3.0E-04	r		0.1	74-31-7	**N,N-Diphenyl-1,4 benzenediamine (DPPD)**	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
8.0E-01	i			7.7E-01	i		0	0.1	122-66-7	1,2-Diphenylhydrazine	6.1E-01	ca	3.1E+00	ca	8.7E-03	ca	8.4E-02	ca		
		9.0E-03	n			9.0E-03	r	0	0.1	127-63-9	Diphenyl sulfone	5.5E+02	nc	7.9E+03	nc	3.3E+01	nc	3.3E+02	nc		
		2.2E-03	i			2.2E-03	r	0	0.1	85-00-7	Diquat	1.3E+02	nc	1.9E+03	nc	8.0E+00	nc	8.0E+01	nc		
8.6E+00	h			8.6E+00	r		0	0.1	1937-37-7	Direct black 38	5.7E-02	ca	2.9E-01	ca	7.8E-04	ca	7.8E-03	ca		
8.1E+00	h			8.1E+00	r		0	0.1	2602-46-2	Direct blue 6	6.0E-02	ca	3.0E-01	ca	8.3E-04	ca	8.3E-03	ca		
9.3E+00	h			9.3E+00	r		0	0.1	16071-86-6	Direct brown 95	5.2E-02	ca	2.7E-01	ca	7.2E-04	ca	7.2E-03	ca		
		4.0E-05	i			4.0E-05	r	0	0.1	298-04-4	Disulfoton	2.4E+00	nc	3.5E+01	nc	1.5E-01	nc	1.5E+00	nc		
		1.0E-02	i			1.0E-02	r	0	0.1	505-29-3	1,4-Dithiane	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		2.0E-03	i			2.0E-03	r	0	0.1	330-54-1	Diuron	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		4.0E-03	i			4.0E-03	r	0	0.1	2439-10-3	Dodine	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		2.0E-01	n							7429-91-6	**Dysprosium**	1.6E+04	nc	1.0E+05	max			7.3E+03	nc		
		6.0E-03	i			6.0E-03	r	0	0.1	115-29-7	Endosulfan	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc	1.8E+01	9.0E-01
		2.0E-02	i			2.0E-02	r	0	0.1	145-73-3	Endothall	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3.0E-04	i			3.0E-04	r	0	0.1	72-20-8	Endrin	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc	1.0E+00	5.0E-02
9.9E-03	i	2.0E-03	h	4.2E-03	i	2.9E-04	i	1		106-89-8	Epichlorohydrin	7.6E+00	nc	2.6E+01	nc	1.0E+00	nc	2.0E+00	nc		
		5.7E-03	r			5.7E-03	i	0	0.1	106-88-7	1,2-Epoxybutane	3.5E+02	nc	5.0E+03	nc	2.1E+01	nc	2.1E+02	nc		
		2.5E-02	i			2.5E-02	r	0	0.1	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.1	16672-87-0	Ethephon (2-chloroethyl phosphonic acid)	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		5.0E-04	i			5.0E-04	r	0	0.1	563-12-2	Ethion	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
		4.0E-01	h			5.7E-02	i	0	0.1	110-80-5	2-Ethoxyethanol	2.4E+04	nc	1.0E+05	max	2.1E+02	nc	1.5E+04	nc		
		3.0E-01	h			3.0E-01	r	0	0.1	111-15-9	2-Ethoxyethanol acetate	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		9.0E-01	i			9.0E-01	r	1		141-78-6	Ethyl acetate	1.9E+04	nc	3.7E+04	sat	3.3E+03	nc	5.5E+03	nc		
4.8E-02	h			4.8E-02	r			1		140-88-5	Ethyl acrylate	2.1E-01	ca	4.5E-01	ca	1.4E-01	ca	2.3E-01	ca		
		1.0E-01	i			2.9E-01	i	1		100-41-4	Ethylbenzene	2.3E+02	sat	2.3E+02	sat	1.1E+03	nc	1.3E+03	nc	1.3E+01	7.0E-01
2.9E-03	n	4.0E-01	n	2.9E-03	r	2.9E+00	i	1		75-00-3	Ethyl chloride	3.0E+00	ca	6.5E+00	ca	2.3E+00	ca	4.6E+00	ca		
		3.0E-01	h			3.0E-01	r	0	0.1	109-78-4	Ethylene cyanohydrin	1.8E+04	nc	1.0E+05	max	1.1E+03	nc	1.1E+04	nc		
		2.0E-02	h			2.0E-02	r	0	0.1	107-15-3	Ethylene diamine	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E+00	i			2.0E+00	r	0	0.1	107-21-1	Ethylene glycol	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		5.0E-01	i			3.7E+00	i	0	0.1	111-76-2	**Ethylene glycol, monobutyl ether**	3.1E+04	nc	1.0E+05	max	1.4E+04	nc	1.8E+04	nc		
1.0E+00	h			3.5E-01	h			1		75-21-8	Ethylene oxide	1.4E-01	ca	3.6E-01	ca	1.9E-02	ca	2.4E-02	ca		

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
								V skin											Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		O abs. C soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
1.1E-01	h	8.0E-05	i	1.1E-01	r	8.0E-05	r	0 0.1	96-45-7	Ethylene thiourea (ETU)	4.4E+00	ca**	2.2E+01	ca**	6.1E-02	ca**	6.1E-01	ca**		
		2.0E-01	i			2.0E-01	r	1	60-29-7	Ethyl ether	1.8E+03	sat	1.8E+03	sat	7.3E+02	nc	1.2E+03	nc		
		9.0E-02	h			9.0E-02	r	1	97-63-2	Ethyl methacrylate	1.4E+02	sat	1.4E+02	sat	3.3E+02	nc	5.5E+02	nc		
		1.0E-05	i			1.0E-05	r	0 0.1	2104-64-5	Ethyl p-nitrophenyl phenylphosphorothioate	6.1E-01	nc	8.8E+00	nc	3.7E-02	nc	3.6E-01	nc		
		3.0E+00	i			3.0E+00	r	0 0.1	84-72-0	Ethylphthalyl ethyl glycolate	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		8.0E-03	i			8.0E-03	r	0 0.1	101200-48-0	Express	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		2.5E-04	i			2.5E-04	r	0 0.1	22224-92-6	Fenamiphos	1.5E+01	nc	2.2E+02	nc	9.1E-01	nc	9.1E+00	nc		
		1.3E-02	i			1.3E-02	r	0 0.1	2164-17-2	Fluometuron	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		6.0E-02	i					0 0.1	16984-48-8	Flouride	3.7E+03	nc	5.3E+04	nc			2.2E+03	nc		
		8.0E-02	i			8.0E-02	r	0 0.1	59756-60-4	Fluoridone	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		2.0E-02	i			2.0E-02	r	0 0.1	56425-91-3	Flurprimidol	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-02	i			6.0E-02	r	0 0.1	66332-96-5	Flutolanil	3.7E+03	nc	5.3E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-02	i			1.0E-02	r	0 0.1	69409-94-5	Fluvalinate	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
3.5E-03	i	1.0E-01	i	3.5E-03	r	1.0E-01	r	0 0.1	133-07-3	Folpet	1.4E+02	ca*	7.0E+02	ca	1.9E+00	ca	1.9E+01	ca		
1.9E-01	i			1.9E-01	r			0 0.1	72178-02-0	Fomesafen	2.6E+00	ca	1.3E+01	ca	3.5E-02	ca	3.5E-01	ca		
		2.0E-03	i			2.0E-03	r	0 0.1	944-22-9	Fonofos	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.5E-01	i	4.6E-02	i			0 0.1	50-00-0	Formaldehyde	9.2E+03	nc	1.0E+05	nc	1.5E-01	ca	5.5E+03	nc		
		2.0E+00	h			2.0E+00	r	0 0.1	64-18-6	Formic Acid	1.0E+05	max	1.0E+05	max	7.3E+03	nc	7.3E+04	nc		
		3.0E+00	i			3.0E+00	r	0 0.1	39148-24-8	Fosetyl-al	1.0E+05	max	1.0E+05	max	1.1E+04	nc	1.1E+05	nc		
		3.0E+01	i			8.6E+00	h	1	76-13-1	Freon 113	5.6E+03	sat	5.6E+03	sat	3.1E+04	nc	5.9E+04	nc		
		1.0E-03	i			1.0E-03	r	1	110-00-9	Furan	2.5E+00	nc	8.5E+00	nc	3.7E+00	nc	6.1E+00	nc		
3.8E+00	h			3.8E+00	r			0 0.1	67-45-8	Furazolidone	1.3E-01	nc	6.5E-01	nc	1.8E-03	nc	1.8E-02	ca		
		3.0E-03	i			1.4E-02	h	0 0.1	98-01-1	Furfural	1.8E+02	nc	2.6E+03	nc	5.2E+01	nc	1.1E+02	nc		
5.0E+01	h			5.0E+01	r			0 0.1	531-82-8	Furium	9.7E-03	ca	4.9E-02	ca	1.3E-04	ca	1.3E-03	ca		
3.0E-02	i			3.0E-02	r			0 0.1	60568-05-0	Furmecyclox	1.6E+01	ca	8.2E+01	ca	2.2E-01	ca	2.2E+00	ca		
		4.0E-04	i			4.0E-04	r	0 0.1	77182-82-2	Glufosinate-ammonium	2.4E+01	nc	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc		
		4.0E-04	i			2.9E-04	h	0 0.1	765-34-4	Glycidaldehyde	2.4E+01	nc	3.5E+02	nc	1.0E+00	nc	1.5E+01	nc		
		1.0E-01	i			1.0E-01	r	0 0.1	1071-83-6	Glyphosate	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-05	i			5.0E-05	r	0 0.1	69806-40-2	Haloxyfop-methyl	3.1E+00	nc	4.4E+01	nc	1.8E-01	nc	1.8E+00	nc		
		1.3E-02	i			1.3E-02	r	0 0.1	79277-27-3	Harmony	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
4.5E+00	i	5.0E-04	i	4.6E+00	i	5.0E-04	r	0 0.1	76-44-8	Heptachlor	1.1E-01	ca	5.5E-01	ca	1.5E-03	ca	1.5E-02	ca	2.3E+01	1.0E+00
9.1E+00	i	1.3E-05	i	9.1E+00	i	1.3E-05	r	0 0.1	1024-57-3	Heptachlor epoxide	5.3E-02	ca*	2.7E-01	ca*	7.4E-04	ca*	7.4E-03	ca*	7.0E-01	3.0E-02
		2.0E-03	i			2.0E-03	r	0 0.1	87-82-1	Hexabromobenzene	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
1.6E+00	i	8.0E-04	i	1.6E+00	i	8.0E-04	r	0 0.1	118-74-1	Hexachlorobenzene	3.0E-01	ca	1.5E+00	ca	4.2E-03	ca	4.2E-02	ca	2.0E+00	1.0E-01
7.8E-02	i	3.0E-04	n	7.8E-02	i	3.0E-04	r	0 0.1	87-68-3	**Hexachlorobutadiene**	6.2E+00	ca**	3.2E+01	ca**	8.6E-02	ca*	8.6E-01	ca*	2.0E+00	1.0E-01
6.3E+00	i			6.3E+00	i			0 0.04	319-84-6	HCH (alpha)	9.0E-02	ca	5.9E-01	ca	1.1E-03	ca	1.1E-02	ca	5.0E-04	3.0E-05
1.8E+00	i			1.8E+00	i			0 0.04	319-85-7	HCH (beta)	3.2E-01	ca	2.1E+00	ca	3.7E-03	ca	3.7E-02	ca	3.0E-03	1.0E-04
1.3E+00	h	3.0E-04	i	1.3E+00	r	3.0E-04	r	0 0.04	58-89-9	HCH (gamma) Lindane	4.4E-01	ca*	2.9E+00	ca	5.2E-03	ca	5.2E-02	ca	9.0E-03	5.0E-04
1.8E+00	i			1.8E+00	i			0 0.04	608-73-1	HCH-technical	3.2E-01	ca	2.1E+00	ca	3.8E-03	ca	3.7E-02	ca	3.0E-03	1.0E-04
		7.0E-03	i			2.0E-05	h	0 0.1	77-47-4	Hexachlorocyclopentadiene	4.2E+02	nc	5.9E+03	nc	7.3E-02	nc	2.6E+02	nc	4.0E+02	2.0E+01
6.2E+03	i			4.6E+03	i			0 0.1	19408-74-3	Hexachlorodibenzo-p-dioxin mixture (HxCDD)	7.8E-05	ca	4.0E-04	ca	1.5E-06	ca	1.1E-05	ca		
1.4E-02	i	1.0E-03	i	1.4E-02	i	1.0E-03	r	0 0.1	67-72-1	Hexachloroethane	3.5E+01	ca**	1.8E+02	ca**	4.8E-01	ca**	4.8E+00	ca**	5.0E-01	2.0E-02
		3.0E-04	i			3.0E-04	r	0 0.1	70-30-4	Hexachlorophene	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r	0 0.1	121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	4.4E+00	ca*	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
		2.9E-06	r			2.9E-06	i	0 0.1	822-06-0	1,6-Hexamethylene diisocyanate	1.7E-01	nc	2.5E+00	nc	1.0E-02	nc	1.0E-01	nc		
		6.0E-02	h			5.7E-02	i	1	110-54-3	n-Hexane	1.1E+02	sat	1.1E+02	sat	2.1E+02	nc	3.5E+02	nc		
		3.3E-02	i			3.3E-02	r	0 0.1	51235-04-2	Hexazinone	2.0E+03	nc	2.9E+04	nc	1.2E+02	nc	1.2E+03	nc		
		5.0E-02	i			5.0E-02	r	0 0.1	2691-41-0	HMX	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
3.0E+00	i			1.7E+01	i			0 0.1	302-01-2	Hydrazine, hydrazine sulfate	1.6E-01	ca	8.2E-01	ca	3.9E-04	ca	2.2E-02	ca		
3.0E+00	n			1.7E+01	n			0.1	60-34-4	**Hydrazine, monomethyl**	1.6E-01	ca	8.2E-01	ca	4.0E-04	ca	2.2E-02	ca		
3.0E+00	n			1.7E+01	n			0.1	57-14-7	**Hydrazine, dimethyl**	1.6E-01	ca	8.2E-01	ca	4.0E-04	ca	2.2E-02	ca		
						5.7E-03	i		7647-01-0	Hydrogen chloride					2.1E+01	nc				
		3.0E-03	i			2.9E-04	i		7783-06-4	Hydrogen sulfide					1.0E+00	nc	1.1E+02	nc		
		4.0E-02	h			4.0E-02	r	0 0.1	123-31-9	p-Hydroquinone	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
								V	skin			Residential		Industrial		Ambient Air		Tap Water		Migration to Ground Water	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		O	abs.	CAS No.		Soil (mg/kg)		Soil (mg/kg)		(ug/m^3)		(ug/l)		DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1.3E-02	i			1.3E-02	r	0	0.1	35554-44-0	Imazalil	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		2.5E-01	i			2.5E-01	r	0	0.1	81335-37-7	Imazaquin	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		4.0E-02	i			4.0E-02	r	0	0.1	36734-19-7	Iprodione	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
		3.0E-01	n					0		7439-89-6	Iron	2.3E+04	nc	1.0E+05	max			1.1E+04	nc		
		3.0E-01	i			3.0E-01	r	1		78-83-1	Isobutanol	1.3E+04	nc	4.0E+04	sat	1.1E+03	nc	1.8E+03	nc		
9.5E-04	i	2.0E-01	i	9.5E-04	r	2.0E-01	r	0	0.1	78-59-1	Isophorone	5.1E+02	ca*	2.6E+03	ca*	7.1E+00	ca	7.1E+01	ca	5.0E-01	3.0E-02
		1.5E-02	i			1.5E-02	r	0	0.1	33820-53-0	Isopropalin	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		1.0E-01	i			1.1E-01	r	0	0.1	1832-54-8	Isopropyl methyl phosphonic acid	6.1E+03	nc	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc		
		5.0E-02	i			5.0E-02	r	0	0.1	82558-50-7	Isoxaben	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
1.8E+01	n			1.8E+01	r			0	0.1	143-50-0	Kepone	2.7E-02	ca	1.4E-01	ca	3.7E-04	ca	3.7E-03	ca		
		2.0E-03	i			2.0E-03	r	0	0.1	77501-63-4	Lactofen	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
PRGs Based on EPA Models (IEUBK 1994 and TRW 1996)										7439-92-1	Lead	4.0E+02	nc	7.5E+02	nc						
		1.0E-07	i					0	0.1	78-00-2	Lead (tetraethyl)	6.1E-03	nc	8.8E-02	nc			3.6E-03	nc		
		2.0E-03	i			2.0E-03	r	0	0.1	330-55-2	Linuron	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	x					0		7439-93-2	Lithium	1.6E+03	nc	4.1E+04	nc			7.3E+02	nc		
		2.0E-01	i			2.0E-01	r	0	0.1	83055-99-6	Londax	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
		2.0E-02	i			2.0E-02	r	0	0.1	121-75-5	Malathion	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.0E-01	i			1.0E-01	r	0	0.1	108-31-6	Maleic anhydride	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		5.0E-01	i			5.0E-01	r	1		123-33-1	Maleic hydrazide	1.7E+03	nc	2.4E+03	sat	1.8E+03	nc	3.0E+03	nc		
		2.0E-05	h			2.0E-05	r	0	0.1	109-77-3	Malononitrile	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
		3.0E-02	h			3.0E-02	r	0	0.1	8018-01-7	Mancozeb	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
6.0E-02	o	5.0E-03	i	6.0E-02	r	5.0E-03	r	0	0.1	12427-38-2	Maneb	8.1E+00	ca*	4.1E+01	ca	1.1E-01	ca	1.1E+00	ca		
		2.4E-02	i			1.4E-05	i	0		7439-96-5	Manganese and compounds	1.8E+03	nc	3.2E+04	nc	5.1E-02	nc	8.8E+02	nc		
		9.0E-05	h			9.0E-05	r	0	0.1	950-10-7	Mephosfolan	5.5E+00	nc	7.9E+01	nc	3.3E-01	nc	3.3E+00	nc		
		3.0E-02	i			3.0E-02	r	0	0.1	24307-26-4	Mepiquat	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
2.9E-02	n	1.0E-01	n	2.9E-02	r	1.0E-01	r	0	0.1	149-30-4	2-Mercaptobenzothiazole	1.7E+01	ca	8.5E+01	ca	2.3E-01	ca	2.3E+00	ca		
		3.0E-04	i					0		7487-94-7	Mercury and compounds	2.3E+01	nc	6.1E+02	nc			1.1E+01	nc		
						8.6E-05	i			7439-97-6	Mercury (elemental)					3.1E-01	nc				
		1.0E-04	i					0	0.1	22967-92-6	Mercury (methyl)	6.1E+00	nc	8.8E+01	nc			3.6E+00	nc		
		3.0E-05	i			3.0E-05	r	0	0.1	150-50-5	Merphos	1.8E+00	nc	2.6E+01	nc	1.1E-01	nc	1.1E+00	nc		
		3.0E-05	i			3.0E-05	r	0	0.1	78-48-8	Merphos oxide	1.8E+00	nc	2.6E+01	nc	1.1E-01	nc	1.1E+00	nc		
		6.0E-02	i			6.0E-02	r	0	0.1	57837-19-1	Metalaxyl	3.7E+03	nc	5.3E+04	nc	2.2E+02	nc	2.2E+03	nc		
		1.0E-04	i			2.0E-04	h	1		126-98-7	Methacrylonitrile	2.1E+00	nc	8.8E+00	nc	7.3E-01	nc	1.0E+00	nc		
		5.0E-05	i			5.0E-05	r	0	0.1	10265-92-6	Methamidophos	3.1E+00	nc	4.4E+01	nc	1.8E-01	nc	1.8E+00	nc		
		5.0E-01	i			5.0E-01	r	0	0.1	67-56-1	Methanol	3.1E+04	nc	1.0E+05	max	1.8E+03	nc	1.8E+04	nc		
		1.0E-03	i			1.0E-03	r	0	0.1	950-37-8	Methidathion	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	i			2.5E-02	r	1		16752-77-5	Methomyl	4.4E+01	nc	1.5E+02	nc	9.1E+01	nc	1.5E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.1	72-43-5	Methoxychlor	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc	1.6E+02	8.0E+00
		1.0E-03	h			5.7E-03	i	0	0.1	109-86-4	2-Methoxyethanol	6.1E+01	nc	8.8E+02	nc	2.1E+01	nc	3.6E+01	nc		
		2.0E-03	h			2.0E-03	r	0	0.1	110-49-6	2-Methoxyethanol acetate	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
4.6E-02	h			4.6E-02	r			0	0.1	99-59-2	2-Methoxy-5-nitroaniline	1.1E+01	ca	5.4E+01	ca	1.5E-01	ca	1.5E+00	ca		
		1.0E+00	h			1.0E+00	r	1		79-20-9	Methyl acetate	2.2E+04	nc	9.6E+04	nc	3.7E+03	nc	6.1E+03	nc		
		3.0E-02	h			3.0E-02	r	1		96-33-3	Methyl acrylate	7.0E+01	nc	2.3E+02	nc	1.1E+02	nc	1.8E+02	nc		
2.4E-01	h			2.4E-01	r			0	0.1	95-53-4	2-Methylaniline (o-toluidine)	2.0E+00	ca	1.0E+01	ca	2.8E-02	ca	2.8E-01	ca		
1.8E-01	h			1.8E-01	r			0	0.1	636-21-5	2-Methylaniline hydrochloride	2.7E+00	ca	1.4E+01	ca	3.7E-02	ca	3.7E-01	ca		
		1.0E+00	x			1.0E+00	r	0	0.1	79-22-1	Methyl chlorocarbonate	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		5.0E-04	i			5.0E-04	i	0	0.1	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
		1.0E-02	i			1.0E-02	r	0	0.1	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-03	i			1.0E-03	r	0	0.1	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		1.0E-03	i			1.0E-03	r	0	0.1	16484-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		8.6E-01	r			8.6E-01	h	1		108-87-2	Methylcyclohexane	2.6E+03	nc	8.8E+03	nc	3.1E+03	nc	5.2E+03	nc		
2.5E-01	h			2.5E-01	r			0	0.1	101-77-9	4,4'-Methylenebisbenzeneamine	1.9E+00	ca	9.9E+00	ca	2.7E-02	ca	2.7E-01	ca		
1.3E-01	h	7.0E-04	h	1.3E-01	h	7.0E-04	r	0	0.1	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+00	ca*	1.9E+01	ca*	5.2E-02	ca*	5.2E-01	ca*		
4.6E-02	i			4.6E-02	r			0	0.1	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+01	ca	5.4E+01	ca	1.5E-01	ca	1.5E+00	ca		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
		1.0E-02	h			1.0E-02	r	1		74-95-3	Methylene bromide	6.7E+01	nc	2.4E+02	nc	3.7E+01	nc	6.1E+01	nc		
7.5E-03	i	6.0E-02	i	1.6E-03	i	8.6E-01	h	1		75-09-2	Methylene chloride	8.9E+00	ca	2.1E+01	ca	4.1E+00	ca	4.3E+00	ca	2.0E-02	1.0E-03
		1.7E-04	r			1.7E-04	i	0	0.1	101-68-8	4,4'-Methylene diphenyl diisocyanate	1.0E+01	nc	1.5E+02	nc	6.2E-01	nc	6.2E+00	nc		
		6.0E-01	i			2.9E-01	i	1		78-93-3	Methyl ethyl ketone	7.3E+03	nc	2.8E+04	nc	1.0E+03	nc	1.9E+03	nc		
1.1E+00	h			1.1E+00	r			0	0.1	60-34-4	Methyl hydrazine	4.4E-01	ca	2.2E+00	ca	6.1E-03	ca	6.1E-02	ca		
		8.0E-02	h			2.3E-02	h	1		108-10-1	Methyl isobutyl ketone	7.9E+02	nc	2.9E+03	nc	8.3E+01	nc	1.6E+02	nc		
		5.7E-04	r			5.7E-04	n	0	0.1	74-93-1	Methyl Mercaptan	3.5E+01	nc	5.0E+02	nc	2.1E+00	nc	2.1E+01	nc		
		1.4E+00	i			2.0E-01	i	1		80-62-6	Methyl methacrylate	2.2E+03	nc	2.7E+03	sat	7.3E+02	nc	1.4E+03	nc		
3.3E-02	h			3.3E-02	r			0	0.1	99-55-8	2-Methyl-5-nitroaniline	1.5E+01	ca	7.5E+01	ca	2.0E-01	ca	2.0E+00	ca		
		2.5E-04	i			2.5E-04	r	0	0.1	298-00-0	Methyl parathion	1.5E+01	nc	2.2E+02	nc	9.1E-01	nc	9.1E+00	nc		
		5.0E-02	i			5.0E-02	r	0	0.1	95-48-7	2-Methylphenol	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc	1.5E+01	8.0E-01
		5.0E-02	i			5.0E-02	r	0	0.1	108-39-4	3-Methylphenol	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5.0E-03	h			5.0E-03	r	0	0.1	106-44-5	4-Methylphenol	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	n			2.0E-02	r	0	0.1	993-13-5	Methyl phosphonic acid	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		6.0E-03	h			1.1E-02	h	1		25013-15-4	Methyl styrene (mixture)	1.3E+02	nc	5.6E+02	nc	4.2E+01	nc	6.0E+01	nc		
		7.0E-02	h			7.0E-02	r	1		98-83-9	Methyl styrene (alpha)	6.8E+02	sat	6.8E+02	sat	2.6E+02	nc	4.3E+02	nc		
						8.6E-01	i	1		1634-04-4	Methyl tertbutyl ether (MTBE)					3.1E+03	nc	2.0E+01	nc/ca		
1.8E-03				1.8E-03				1			"CAL-Modified PRG"	1.7E+01	ca	3.7E+01	ca	3.7E+00	ca	6.2E+00	ca		
		1.5E-01	i			1.5E-01	r	0	0.1	51218-45-2	Metolaclor (Dual)	9.2E+03	nc	1.0E+05	max	5.5E+02	nc	5.5E+03	nc		
		2.5E-02	i			2.5E-02	r	0	0.1	21087-64-9	Metribuzin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
1.8E+00	x	2.0E-04	i	1.8E+00	r	2.0E-04	r	0	0.1	2385-85-5	Mirex	2.7E-01	ca*	1.4E+00	ca	3.7E-03	ca	3.7E-02	ca		
		2.0E-03	i			2.0E-03	r	0	0.1	2212-67-1	Molinate	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5.0E-03	h					0		7439-98-7	Molybdenum	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc		
		1.0E-01	h			1.0E-01	h	0	0.1	10599-90-3	Monochloramine	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-03	i			2.0E-03	r	0	0.1	300-76-5	Naled	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		1.0E-01	i			1.0E-01	r	0	0.1	15299-99-7	Napropamide	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		2.0E-02	i					0		7440-02-0	Nickel (soluble salts)	1.6E+03	nc	4.1E+04	nc			7.3E+02	nc	1.3E+02	7.0E+00
											"CAL-Modified PRG" (PEA, 1994)	1.5E+02									
				8.4E-01	i			0			Nickel refinery dust					8.0E-03	ca				
				1.7E+00	i			0		12035-72-2	Nickel subsulfide			1.1E+04	ca	4.0E-03	ca				
		1.5E-03	x			1.5E-03	r	0	0.1	1929-82-4	Nitrapyrin	9.2E+01	nc	1.3E+03	nc	5.5E+00	nc	5.5E+01	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-55-8	Nitrate							1.0E+04	nc		
		1.0E-01	x							10102-43-9	Nitric Oxide	7.8E+03	nc	1.0E+05	max			3.6E+03	nc		
Tap Water PRG Based on Infant NOAEL (see IRIS)										14797-65-0	Nitrite							1.0E+03	nc		
		5.7E-05	r			5.7E-05	h	0	0.1	88-74-4	2-Nitroaniline	3.5E+00	nc	5.0E+01	nc	2.1E-01	nc	2.1E+00	nc		
		5.0E-04	i			5.7E-04	h	1		98-95-3	Nitrobenzene	2.0E+01	nc	1.1E+02	nc	2.1E+00	nc	3.4E+00	nc	1.0E-01	7.0E-03
		7.0E-02	h			7.0E-02	r	0	0.1	67-20-9	Nitrofurantoin	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
1.5E+00	h			9.4E+00	h			0	0.1	59-87-0	Nitrofurazone	3.2E-01	ca	1.6E+00	ca	7.2E-04	ca	4.5E-02	ca		
1.4E-02	n			1.4E-02	r			0	0.1	55-63-0	Nitroglycerin	3.5E+01	ca	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		1.0E-01	i			1.0E-01	r	0	0.1	556-88-7	Nitroguanidine	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
		8.0E-03	n			8.0E-03	r	0	0.1	100-02-7	4-Nitrophenol	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
9.4E+00	i	5.7E-03	i	9.4E+00	h	5.7E-03	i	1		79-46-9	2-Nitropropane					7.2E-04	ca	1.2E-03	ca		
5.4E+00	i			5.6E+00	i			1		924-16-3	N-Nitrosodi-n-butylamine	2.4E-02	ca	6.1E-02	ca	1.2E-03	ca	2.0E-03	ca		
2.8E+00	i			2.8E+00	r			0	0.1	1116-54-7	N-Nitrosodiethanolamine	1.7E-01	ca	8.8E-01	ca	2.4E-03	ca	2.4E-02	ca		
1.5E+02	i			1.5E+02	i			0	0.1	55-18-5	N-Nitrosodiethylamine	3.2E-03	ca	1.6E-02	ca	4.5E-05	ca	4.5E-04	ca		
5.1E+01	i			4.9E+01	i			0	0.1	62-75-9	N-Nitrosodimethylamine	9.5E-03	ca	4.8E-02	ca	1.4E-04	ca	1.3E-03	ca		
4.9E-03	i			4.9E-03	r			0	0.1	86-30-6	N-Nitrosodiphenylamine	9.9E+01	ca	5.0E+02	ca	1.4E+00	ca	1.4E+01	ca	1.0E+00	6.0E-02
7.0E+00	i			7.0E+00	r			0	0.1	621-64-7	N-Nitroso di-n-propylamine	6.9E-02	ca	3.5E-01	ca	9.6E-04	ca	9.6E-03	ca	5.0E-05	2.0E-06
2.2E+01	i			2.2E+01	r			0	0.1	10595-95-6	N-Nitroso-N-methylethylamine	2.2E-02	ca	1.1E-01	ca	3.1E-04	ca	3.1E-03	ca		
2.1E+00	i			2.1E+00	i			0	0.1	930-55-2	N-Nitrosopyrrolidine	2.3E-01	ca	1.2E+00	ca	3.1E-03	ca	3.2E-02	ca		
		1.0E-02	h			1.0E-02	r	1		99-08-1	m-Nitrotoluene	3.7E+02	nc	1.0E+03	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	h			1.0E-02	r	1		88-72-2	o-Nitrotoluene	3.7E+02	nc	1.0E+03	sat	3.7E+01	nc	6.1E+01	nc		
		1.0E-02	h			1.0E-02	r	1		99-99-0	p-Nitrotoluene	3.7E+02	nc	1.0E+03	sat	3.7E+01	nc	6.1E+01	nc		
		4.0E-02	i			4.0E-02	r	0	0.1	27314-13-2	Norflurazon	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		

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FOR PLANNING PURPOSES

TOXICITY INFORMATION										CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C	skin abs. soils	CAS No		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
		7 0E-04	i			7 0E-04	r 0	0 1	85509-19-9	NuStar	4.3E+01	nc	6.2E+02	nc	2.6E+00	nc	2.6E+01	nc		
		3 0E-03	i			3 0E-03	r 0	0 1	32536-52-0	Octabromodiphenyl ether	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2 0E-03	h			2 0E-03	r 0	0 1	152-16-9	Octamethylpyrophosphoramide	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		5 0E-02	i			5 0E-02	r 0	0 1	19044-88-3	Oryzalin	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		5 0E-03	i			5 0E-03	r 0	0 1	19666-30-9	Oxadiazon	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2 5E-02	i			2 5E-02	r 0	0 1	23135-22-0	Oxamyl	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		3 0E-03	i			3 0E-03	r 0	0 1	42874-03-3	Oxyfluorfen	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		1 3E-02	i			1 3E-02	r 0	0 1	76738-62-0	Paclobutrazol	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		4 5E-03	i			4 5E-03	r 0	0 1	4685-14-7	Paraquat	2.7E+02	nc	4.0E+03	nc	1.6E+01	nc	1.6E+02	nc		
		6 0E-03	h			6 0E-03	r 0	0 1	56-38-2	Parathion	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		5 0E-02	h			5 0E-02	r 0	0 1	1114-71-2	Pebulate	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4 0E-02	i			4 0E-02	r 0	0 1	40487-42-1	Pendimethalin	2.4E+03	nc	3.5E+04	nc	1.5E+02	nc	1.5E+03	nc		
2 3E-02	h			2 3E-02	r		0	0 1	87-84-3	Pentabromo-6-chloro cyclohexane	2.1E+01	ca	1.1E+02	ca	2.9E-01	ca	2.9E+00	ca		
		2 0E-03	i			2 0E-03	r 0	0 1	32534-81-9	Pentabromodiphenyl ether	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		8 0E-04	i			8 0E-04	r 0	0 1	608-93-5	Pentachlorobenzene	4.9E+01	nc	7.0E+02	nc	2.9E+00	nc	2.9E+01	nc		
2 6E-01	h	3 0E-03	i	2 6E-01	r	3 0E-03	r 0	0 1	82-68-8	Pentachloronitrobenzene	1.9E+00	ca*	9.5E+00	ca	2.6E-02	ca	2.6E-01	ca		
1 2E-01	i	3 0E-02	i	1 2E-01	r	3 0E-02	r 0	0 25	87-86-5	Pentachlorophenol	3.0E+00	ca	1.1E+01	ca	5.6E-02	ca	5.6E-01	ca	3.0E-02	1.0E-03
		5 0E-04	x				0		7601-90-3	Perchlorate	3.9E+01	nc	1.0E+03	nc			1.8E+01	nc		
		5 0E-02	i			5 0E-02	r 0	0 1	52645-53-1	Permethrin	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		2 5E-01	i			2 5E-01	r 0	0 1	13684-63-4	Phenmedipham	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		6 0E-01	i			6 0E-01	r 0	0 1	108-95-2	Phenol	3.7E+04	nc	1.0E+05	max	2.2E+03	nc	2.2E+04	nc	1.0E+02	5.0E+00
		2 0E-03	n			2 0E-03	r 0	0 1	92-84-2	Phenothiazine	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		6 0E-03	i			6 0E-03	r 0	0 1	108-45-2	m-Phenylenediamine	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		1 9E-01	h			1 9E-01	r 0	0 1	106-50-3	p-Phenylenediamine	1.2E+04	nc	1.0E+05	max	6.9E+02	nc	6.9E+03	nc		
		8 0E-05	i			8 0E-05	r 0	0 1	62-38-4	Phenylmercuric acetate	4.9E+00	nc	7.0E+01	nc	2.9E-01	nc	2.9E+00	nc		
1 9E-03	h			1 9E-03	r		0	0 1	90-43-7	2-Phenylphenol	2.5E+02	ca	1.3E+03	ca	3.5E+00	ca	3.5E+01	ca		
		2 0E-04	h			2 0E-04	r 0	0 1	298-02-2	Phorate	1.2E+01	nc	1.8E+02	nc	7.3E-01	nc	7.3E+00	nc		
		2 0E-02	i			2 0E-02	r 0	0 1	732-11-6	Phosmet	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		3 0E-04	h			8 6E-05	i 0	0 1	7803-51-2	Phosphine	1.8E+01	nc	2.6E+02	nc	3.1E-01	nc	1.1E+01	nc		
						2 9E-03	i		7664-38-2	Phosphoric acid					1.0E+01	nc				
		2 0E-05	i				0		7723-14-0	Phosphorus (white)	1.6E+00	nc	4.1E+01	nc			7.3E-01	nc		
		1 0E+00	h			1 0E+00	r 0	0 1	100-21-0	p-Phthalic acid	6.1E+04	nc	1.0E+05	max	3.7E+03	nc	3.6E+04	nc		
		2 0E+00	i			3 4E-02	h 0	0 1	85-44-9	Phthalic anhydride	1.0E+05	max	1.0E+05	max	1.2E+02	nc	7.3E+04	nc		
		7 0E-02	i			7 0E-02	r 0	0 1	1918-02-1	Picloram	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
		1 0E-02	i			1 0E-02	r 0	0 1	23505-41-1	Pirimiphos-methyl	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
8 9E+00	h	7 0E-06	h	8 9E+00	r	7 0E-06	r 0	0 1		Polybrominated biphenyls	5.5E-02	ca**	2.8E-01	ca*	7.6E-04	ca*	7.6E-03	ca*		
2 0E+00	i			2 0E+00	i		0	0 14	1336-36-3	Polychlorinated biphenyls (PCBs)	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
7 0E-02	i	7 0E-05	i	7 0E-02	i	7 0E-05	r 0	0 14	12674-11-2	Aroclor 1016	3.9E+00	nc	2.9E+01	ca**	9.6E-02	ca**	9.6E-01	ca**		
2 0E+00	i			2 0E+00	i		0	0 14	11104-28-2	Aroclor 1221	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2 0E+00	i			2 0E+00	i		0	0 14	11141-16-5	Aroclor 1232	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2 0E+00	i			2 0E+00	i		0	0 14	53469-21-9	Aroclor 1242	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2 0E+00	i			2 0E+00	i		0	0 14	12672-29-6	Aroclor 1248	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
2 0E+00	i	2 0E-05	i	2 0E+00	i	2 0E-05	r 0	0 14	11097-69-1	Aroclor 1254	2.2E-01	ca**	1.0E+00	ca*	3.4E-03	ca*	3.4E-02	ca*		
2 0E+00	i			2 0E+00	i		0	0 14	11096-82-5	Aroclor 1260	2.2E-01	ca	1.0E+00	ca	3.4E-03	ca	3.4E-02	ca		
								0 13		Polynuclear aromatic hydrocarbons (PAHs)										
		6 0E-02	i			6 0E-02	r 1		83-32-9	Acenaphthene	3.7E+03	nc	3.8E+04	nc	2.2E+02	nc	3.7E+02	nc	5.7E+02	2.9E+01
		3 0E-01	i			3 0E-01	r 1		120-12-7	Anthracene	2.2E+04	nc	1.0E+05	max	1.1E+03	nc	1.8E+03	nc	1.2E+04	5.9E+02
7 3E-01	n			3 1E-01	n		0	0 13	56-55-3	Benz[a]anthracene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	2.0E+00	8.0E-02
7 3E-01	n			3 1E-01	n		0	0 13	205-99-2	Benzo[b]fluoranthene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	5.0E+00	2.0E-01
7 3E-02	n			3 1E-02	n		0	0 13	207-08-9	Benzo[k]fluoranthene	6.2E+00	ca	2.9E+01	ca	2.2E-01	ca	9.2E-01	ca	4.9E+01	2.0E+00
										"CAL-Modified PRG" (PEA, 1994)	6.1E-01									
7 3E+00	i			3 1E+00	n		0	0 13	50-32-8	Benzo[a]pyrene	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	8.0E+00	4.0E-01
										"CAL-Modified PRG" (PEA, 1994)							1.5E-03			
7 3E-03	n			3 1E-03	n		0	0 13	218-01-9	Chrysene	6.2E+01	ca	2.9E+02	ca	2.2E+00	ca	9.2E+00	ca	1.6E+02	8.0E+00

Key: i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION								CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)	V O C / skin abs. soils	CAS No		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
									"CAL-Modified PRG" (PEA, 1994)	6.1E+00									
7.3E+00	n			3.1E+00	n		0 0.13	53-70-3	Dibenz[ah]anthracene	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	2.0E+00	8.0E-02
		4.0E-02	i			4.0E-02	r 0 0.13	206-44-0	Fluoranthene	2.3E+03	nc	3.0E+04	nc	1.5E+02	nc	1.5E+03	nc	4.3E+03	2.1E+02
		4.0E-02	i			4.0E-02	r 1	86-73-7	Fluorene	2.6E+03	nc	3.3E+04	nc	1.5E+02	nc	2.4E+02	nc	5.6E+02	2.8E+01
7.3E-01	n			3.1E-01	n		0 0.13	193-39-5	Indeno[1,2,3-cd]pyrene	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	1.4E+01	7.0E-01
		2.0E-02	i			8.6E-04	i 1	91-20-3	Naphthalene	5.6E+01	nc	1.9E+02	nc	3.1E+00	nc	6.2E+00	nc	8.4E+01	4.0E+00
		3.0E-02	i			3.0E-02	r 1	129-00-0	Pyrene	2.3E+03	nc	5.4E+04	nc	1.1E+02	nc	1.8E+02	nc	4.2E+03	2.1E+02
1.5E-01	i	9.0E-03	i	1.5E-01	r	9.0E-03	r 0 0.1	67747-09-5	Prochloraz	3.2E+00	ca	1.6E+01	ca	4.5E-02	ca	4.5E-01	ca		
		6.0E-03	h			6.0E-03	r 0 0.1	26399-36-0	Profluralin	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc		
		1.5E-02	i			1.5E-02	r 0 0.1	1610-18-0	Prometon	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc		
		4.0E-03	i			4.0E-03	r 0 0.1	7287-19-6	Prometryn	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		7.5E-02	i			7.5E-02	r 0 0.1	23950-58-5	Pronamide	4.6E+03	nc	6.6E+04	nc	2.7E+02	nc	2.7E+03	nc		
		1.3E-02	i			1.3E-02	r 0 0.1	1918-16-7	Propachlor	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		5.0E-03	i			5.0E-03	r 0 0.1	709-98-8	Propanil	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		2.0E-02	i			2.0E-02	r 0 0.1	2312-35-8	Propargite	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-03	i			2.0E-03	r 0 0.1	107-19-7	Propargyl alcohol	1.2E+02	nc	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc		
		2.0E-02	i			2.0E-02	r 0 0.1	139-40-2	Propazine	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		2.0E-02	i			2.0E-02	r 0 0.1	122-42-9	Propham	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.3E-02	i			1.3E-02	r 0 0.1	60207-90-1	Propiconazole	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		1.0E-01	i			1.1E-01	i 1	98-82-8	Isopropylbenzene (Cumene)	1.6E+02	nc	5.2E+02	nc	4.0E+02	nc	6.6E+02	nc		
		1.0E-02	n			1.0E-02	r 1	103-65-1	n-Propylbenzene	1.4E+02	nc	2.4E+02	sat	3.7E+01	nc	6.1E+01	nc		
		2.0E+01	h			2.0E+01	r 0 0.1	57-55-6	Propylene glycol	1.0E+05	max	1.0E+05	max	7.3E+04	nc	7.3E+05	nc		
		7.0E-01	h			7.0E-01	r 0 0.1	111-35-3	Propylene glycol, monoethyl ether	4.3E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc		
		7.0E-01	h			5.7E-01	i 0 0.1	107-98-2	Propylene glycol, monomethyl ether	4.3E+04	nc	1.0E+05	max	2.1E+03	nc	2.6E+04	nc		
2.4E-01	i	8.6E-03	r	1.3E-02	i	8.6E-03	i 1	75-56-9	Propylene oxide	1.9E+00	ca*	9.1E+00	ca*	5.2E-01	ca*	2.2E-01	ca		
		2.5E-01	i			2.5E-01	r 0 0.1	81335-77-5	Pursuit	1.5E+04	nc	1.0E+05	max	9.1E+02	nc	9.1E+03	nc		
		2.5E-02	i			2.5E-02	r 0 0.1	51630-58-1	Pydrin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		1.0E-03	i			1.0E-03	r 0 0.1	110-86-1	Pyridine	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		5.0E-04	i			5.0E-04	r 0 0.1	13593-03-8	Quinalphos	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
1.2E+01	h			1.2E+01	r		0 0.1	91-22-5	Quinoline	4.1E-02	ca	2.1E-01	ca	5.6E-04	ca	5.6E-03	ca		
1.1E-01	i	3.0E-03	i	1.1E-01	r	3.0E-03	r 0 0.1	121-82-4	RDX (Cyclonite)	4.4E+00	ca*	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca		
		3.0E-02	i			3.0E-02	r 0 0.1	10453-86-8	Resmethrin	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		5.0E-02	h			5.0E-02	r 0 0.1	299-84-3	Ronnel	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		
		4.0E-03	i			4.0E-03	r 0 0.1	83-79-4	Rotenone	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc		
		2.5E-02	i			2.5E-02	r 0 0.1	78587-05-0	Savey	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		5.0E-03	i				0 0.1	7783-00-8	Selenious Acid	3.1E+02	nc	4.4E+03	nc			1.8E+02	nc		
		5.0E-03	i				0	7782-49-2	Selenium	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc	5.0E+00	3.0E-01
		5.0E-03	h				0 0.1	630-10-4	Selenourea	3.1E+02	nc	4.4E+03	nc			1.8E+02	nc		
		9.0E-02	i			9.0E-02	r 0 0.1	74051-80-2	Sethoxydim	5.5E+03	nc	7.9E+04	nc	3.3E+02	nc	3.3E+03	nc		
		5.0E-03	i				0	7440-22-4	Silver and compounds	3.9E+02	nc	1.0E+04	nc			1.8E+02	nc	3.4E+01	2.0E+00
1.2E-01	h	5.0E-03	i	1.2E-01	r	2.0E-03	r 0 0.1	122-34-9	Simazine	4.1E+00	ca*	2.1E+01	ca	5.6E-02	ca	5.6E-01	ca		
		4.0E-03	i					26628-22-8	Sodium azide										
2.7E-01	h	3.0E-02	i	2.7E-01	r	3.0E-02	r 0 0.1	148-18-5	Sodium diethyldithiocarbamate	1.8E+00	ca	9.1E+00	ca	2.5E-02	ca	2.5E-01	ca		
		2.0E-05	i			2.0E-05	r 0 0.1	62-74-8	Sodium fluoroacetate	1.2E+00	nc	1.8E+01	nc	7.3E-02	nc	7.3E-01	nc		
		1.0E-03	h			1.0E-03	r 0 0.1	13718-26-8	Sodium metavanadate	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		6.0E-01	i				0	7440-24-6	Strontium, stable	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		3.0E-04	i			3.0E-04	r 0 0.1	57-24-9	Strychnine	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2.0E-01	i			2.9E-01	i 1	100-42-5	Styrene	1.7E+03	sat	1.7E+03	sat	1.1E+03	nc	1.6E+03	nc	4.0E+00	2.0E-01
		1.0E-03	n			1.0E-03	r	80-07-9	1,1'-Sulfonylbis (4-chlorobenzene)	7.8E+01	nc	2.0E+03	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	i			2.5E-02	r 0 0.1	88671-89-0	Systhane	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
1.5E+05	h			1.5E+05	h		0 0.03	1746-01-6	2,3,7,8-TCDD (dioxin)	3.9E-06	ca	2.7E-05	ca	4.5E-08	ca	4.5E-07	ca		
		7.0E-02	i			7.0E-02	r 0 0.1	34014-18-1	Tebuthiuron	4.3E+03	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc		
		2.0E-02	h			2.0E-02	r 0 0.1	3383-96-8	Temephos	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc		
		1.3E-02	i			1.3E-02	r 0 0.1	5902-51-2	Terbacil	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		

Key i=IRIS h=HEAST n=NCEA x=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION											CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFI 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
		2.5E-05	h			2.5E-05	r	0	0.1	13071-79-9	Terbufos	1.5E+00	nc	2.2E+01	nc	9.1E-02	nc	9.1E-01	nc		
		1.0E-03	i			1.0E-03	r	0	0.1	886-50-0	Terbutryn	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		3.0E-04	i			3.0E-04	r	0	0.1	95-94-3	1,2,4,5-Tetrachlorobenzene	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
2.6E-02	i	3.0E-02	i	2.6E-02	i	3.0E-02	r	1		630-20-6	1,1,1,2-Tetrachloroethane	3.0E+00	ca	7.0E+00	ca	2.6E-01	ca	4.3E-01	ca		
2.0E-01	i	6.0E-02	n	2.0E-01	i	6.0E-02	r	1		79-34-5	1,1,2,2-Tetrachloroethane	3.8E-01	ca	9.0E-01	ca	3.3E-02	ca	5.5E-02	ca	3.0E-03	2.0E-04
5.2E-02	n	1.0E-02	i	2.0E-03	n	1.1E-01	n	1		127-18-4	Tetrachloroethylene (PCE)	5.7E+00	ca*	1.9E+01	ca*	3.3E+00	ca	1.1E+00	ca	6.0E-02	3.0E-03
											"CAL-Modified PRG" (PEA, 1994)							3.2E-01			
		3.0E-02	i			3.0E-02	r	0	0.1	58-90-2	2,3,4,6-Tetrachlorophenol	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
2.0E+01	h			2.0E+01	r			0	0.1	5216-25-1	p,a,a,a-Tetrachlorotoluene	2.4E-02	ca	1.2E-01	ca	3.4E-04	ca	3.4E-03	ca		
2.4E-02	h	3.0E-02	i	2.4E-02	r	3.0E-02	r	0	0.1	961-11-5	Tetrachlorovinphos	2.0E+01	ca*	1.0E+02	ca	2.8E-01	ca	2.8E+00	ca		
		5.0E-04	i			5.0E-04	r	0	0.1	3689-24-5	Tetraethyldithiopyrophosphate	3.1E+01	nc	4.4E+02	nc	1.8E+00	nc	1.8E+01	nc		
7.6E-03	n	2.1E-01	n	6.8E-03	n	8.6E-02	n	0	0.1	109-99-9	Tetrahydrofuran	6.4E+01	ca	3.2E+02	ca	9.9E-01	ca	8.8E+00	ca		
		6.6E-05	i					0		7446-18-6	**Thallium and compounds**	5.2E+00	nc	1.3E+02	nc			2.4E+00	nc		
		1.0E-02	i			1.0E-02	r	0	0.1	28249-77-6	Thiobencarb	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		1.0E-01	n			1.0E-01	r	0	0.1	N/A	Thiocyanate	6.1E+03	nc	1.0E+05	max	3.7E+02	nc	3.6E+03	nc		
		3.0E-04	h			3.0E-04	r	0	0.1	39196-18-4	Thiofanox	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		8.0E-02	i			8.0E-02	r	0	0.1	23564-05-8	Thiophanate-methyl	4.9E+03	nc	7.0E+04	nc	2.9E+02	nc	2.9E+03	nc		
		5.0E-03	i			5.0E-03	r	0	0.1	137-26-8	Thiram	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		6.0E-01	h					0			Tin (inorganic, see tributyltin oxide for organic tin)	4.7E+04	nc	1.0E+05	max			2.2E+04	nc		
		2.0E-01	i			1.1E-01	h	1		108-88-3	Toluene	5.2E+02	sat	5.2E+02	sat	4.0E+02	nc	7.2E+02	nc	1.2E+01	6.0E-01
3.2E+00	h			3.2E+00	r			0	0.1	95-80-7	Toluene-2,4-diamine	1.5E-01	ca	7.7E-01	ca	2.1E-03	ca	2.1E-02	ca		
		6.0E-01	h			6.0E-01	r	0	0.1	95-70-5	Toluene-2,5-diamine	3.7E+04	nc	1.0E+05	max	2.2E+03	nc	2.2E+04	nc		
		2.0E-01	h			2.0E-01	r	0	0.1	823-40-5	Toluene-2,6-diamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc		
1.9E-01	i			1.9E-01	r			0	0.1	106-49-0	p-Toluidine	2.6E+00	ca	1.3E+01	ca	3.5E-02	ca	3.5E-01	ca		
1.1E+00	i			1.1E+00	i			0	0.1	8001-35-2	Toxaphene	4.4E-01	ca	2.2E+00	ca	6.0E-03	ca	6.1E-02	ca	3.1E+01	2.0E+00
		7.5E-03	i			7.5E-03	r	0	0.1	66841-25-6	Tralomethrin	4.6E+02	nc	6.6E+03	nc	2.7E+01	nc	2.7E+02	nc		
		1.3E-02	i			1.3E-02	r	0	0.1	2303-17-5	Triallate	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc		
		1.0E-02	i			1.0E-02	r	0	0.1	82097-50-5	Triasulfuron	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		5.0E-03	i			5.0E-03	r	0	0.1	615-54-3	1,2,4-Tribromobenzene	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc		
		3.0E-04	i					0	0.1	56-35-9	Tributyltin oxide (TBTO)	1.8E+01	nc	2.6E+02	nc			1.1E+01	nc		
3.4E-02	h			3.4E-02	r			0	0.1	634-93-5	2,4,6-Trichloroaniline	1.4E+01	ca	7.3E+01	ca	2.0E-01	ca	2.0E+00	ca		
2.9E-02	h			2.9E-02	r			0	0.1	33663-50-2	2,4,6-Trichloroaniline hydrochloride	1.7E+01	ca	8.5E+01	ca	2.3E-01	ca	2.3E+00	ca		
		1.0E-02	i			5.7E-02	h	1		120-82-1	1,2,4-Trichlorobenzene	6.5E+02	nc	3.0E+03	sat	2.1E+02	nc	1.9E+02	nc	5.0E+00	3.0E-01
		2.0E-02	n			2.9E-01	n	1		71-55-6	1,1,1-Trichloroethane	6.3E+02	nc	1.4E+03	sat	1.0E+03	nc	5.4E+02	nc	2.0E+00	1.0E-01
5.7E-02	i	4.0E-03	i	5.6E-02	i	4.0E-03	r	1		79-00-5	1,1,2-Trichloroethane	8.4E-01	ca*	1.9E+00	ca*	1.2E-01	ca	2.0E-01	ca	2.0E-02	9.0E-04
1.1E-02	n	6.0E-03	x	6.0E-03	n	6.0E-03	r	1		79-01-6	Trichloroethylene (TCE)	2.8E+00	ca**	6.1E+00	ca*	1.1E+00	ca*	1.6E+00	ca*	6.0E-02	3.0E-03
		3.0E-01	i			2.0E-01	h	1		75-69-4	Trichlorofluoromethane	3.9E+02	nc	2.0E+03	sat	7.3E+02	nc	1.3E+03	nc		
		1.0E-01	i			1.0E-01	r	0	0.1	95-95-4	2,4,5-Trichlorophenol	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc	2.7E+02	1.4E+01
1.1E-02	i			1.1E-02	i			0	0.1	88-06-2	2,4,6-Trichlorophenol	4.4E+01	ca	2.2E+02	ca	6.2E-01	ca	6.1E+00	ca	2.0E-01	8.0E-03
		1.0E-02	i			1.0E-02	r	0	0.1	93-76-5	2,4,5-Trichlorophenoxyacetic Acid	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		
		8.0E-03	i			8.0E-03	r	0	0.1	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	4.9E+02	nc	7.0E+03	nc	2.9E+01	nc	2.9E+02	nc		
		5.0E-03	i			5.0E-03	r	1		598-77-6	1,1,2-Trichloropropane	1.5E+01	nc	5.1E+01	nc	1.8E+01	nc	3.0E+01	nc		
7.0E+00	h	6.0E-03	i	7.0E+00	r	5.0E-03	r	1		96-18-4	1,2,3-Trichloropropane	1.4E-03	ca	3.1E-03	ca	9.6E-04	ca	1.6E-03	ca		
		5.0E-03	h			5.0E-03	r	1		96-19-5	1,2,3-Trichloropropene	1.2E+01	nc	3.9E+01	nc	1.8E+01	nc	3.0E+01	nc		
		3.0E+01	i			8.6E+00	h	1		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+03	sat	5.6E+03	sat	3.1E+04	nc	5.9E+04	nc		
		3.0E-03	i			3.0E-03	r	0	0.1	58138-08-2	Tridiphane	1.8E+02	nc	2.6E+03	nc	1.1E+01	nc	1.1E+02	nc		
		2.0E-03	r			2.0E-03	i	1		121-44-8	Triethylamine	2.3E+01	nc	8.8E+01	nc	7.3E+00	nc	1.2E+01	nc		
7.7E-03	i	7.5E-03	i	7.7E-03	r	7.5E-03	r	0	0.1	1582-09-8	Trifluralin	6.3E+01	ca**	3.2E+02	ca*	8.7E-01	ca*	8.7E+00	ca*		
		1.4E-04	r			1.4E-04	n		0.1	552-30-7	**Trimellitic Anhydride (TMAN)**	8.6E+00	nc	1.2E+02	nc	5.1E-01	nc	5.1E+00			
		5.0E-02	n			1.7E-03	n	1		95-63-6	1,2,4-Trimethylbenzene	5.2E+01	nc	1.7E+02	nc	6.2E+00	nc	1.2E+01	nc		
		5.0E-02	n			1.7E-03	n	1		108-67-8	1,3,5-Trimethylbenzene	2.1E+01	nc	7.0E+01	nc	6.2E+00	nc	1.2E+01	nc		
3.7E-02	h			3.7E-02	r			0	0.1	512-56-1	Trimethyl phosphate	1.3E+01	ca	6.7E+01	ca	1.8E-01	ca	1.8E+00	ca		
		3.0E-02	i			3.0E-02	r	0	0.1	99-35-4	1,3,5-Trinitrobenzene	1.8E+03	nc	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc		
		1.0E-02	h			1.0E-02	r	0	0.1	479-45-8	Trinitrophenylmethylnitramine	6.1E+02	nc	8.8E+03	nc	3.7E+01	nc	3.6E+02	nc		

Key: i=IRIS h=HEAST n=NCEA a=WITHDRAWN o=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where nc < 100X ca) **(where nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION									CONTAMINANT	PRELIMINARY REMEDIATION GOALS (PRGs)								SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)		RfDo (mg/kg-d)		SFi 1/(mg/kg-d)		RfDi (mg/kg-d)		V O C	skin abs. soils	CAS No.		Residential Soil (mg/kg)		Industrial Soil (mg/kg)		Ambient Air (ug/m^3)		Tap Water (ug/l)		Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
3.0E-02	i	5.0E-04	i	3.0E-02	r	5.0E-04	r	0	0.1	118-96-7	2,4,6-Trinitrotoluene	1.6E+01	ca**	8.2E+01	ca**	2.2E-01	ca**	2.2E+00	ca**		
		1.0E-01	n			1.0E-01	r		0.1	791-28-6	Triphenylphosphine oxide	6.1E+03	nc	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc		
1.4E-02	n	3.0E-01	n	1.4E-02	r	3.0E-01	r		0.1	115-96-8	Tris(2-chloroethyl) phosphate	3.5E+01	ca	1.8E+02	ca	4.8E-01	ca	4.8E+00	ca		
		2.0E-04	n							7440-61-0	Uranium (chemical toxicity only)	1.6E+01	nc	4.1E+02	nc			7.3E+00	nc		
		7.0E-03	h					0		7440-62-2	Vanadium and compounds	5.5E+02	nc	1.4E+04	nc			2.6E+02	nc	6.0E+03	3.0E+02
		1.0E-03	i			1.0E-03	r	0	0.1	1929-77-7	Vernam	6.1E+01	nc	8.8E+02	nc	3.7E+00	nc	3.6E+01	nc		
		2.5E-02	i			2.5E-02	r	0	0.1	50471-44-8	Vinclozolin	1.5E+03	nc	2.2E+04	nc	9.1E+01	nc	9.1E+02	nc		
		1.0E+00	h			5.7E-02	i	1		108-05-4	Vinyl acetate	4.3E+02	nc	1.4E+03	nc	2.1E+02	nc	4.1E+02	nc	1.7E+02	8.0E+00
1.1E-01	r	8.6E-04	r	1.1E-01	h	8.6E-04	i	1		593-60-2	Vinyl bromide (bromoethene)	1.9E-01	ca*	4.2E-01	ca*	6.1E-02	ca*	1.0E-01	ca*		
1.5E+00	i	3.0E-03	i	3.1E-02	i	2.9E-02	i	1		75-01-4	Vinyl chloride (child/adult)	1.5E-01	ca			2.2E-01	ca	4.1E-02	ca	1.0E-02	7.0E-04
7.5E-01	i	3.0E-03	i	1.6E-02	i	2.9E-02	i	1		75-01-4	Vinyl chloride (adult)			8.3E-01	ca						
		3.0E-04	i			3.0E-04	r	0	0.1	81-81-2	Warfarin	1.8E+01	nc	2.6E+02	nc	1.1E+00	nc	1.1E+01	nc		
		2.0E+00	i			2.0E-01	a	1	0.1	1330-20-7	Xylenes	2.1E+02	sat	2.1E+02	sat	7.3E+02	nc	1.4E+03	nc	2.1E+02	1.0E+01
		3.0E-01	i					0		7440-66-6	Zinc	2.3E+04	nc	1.0E+05	max			1.1E+04	nc	1.2E+04	6.2E+02
		3.0E-04	i					0		1314-84-7	Zinc phosphide	2.3E+01	nc	6.1E+02	nc			1.1E+01	nc		
		5.0E-02	i			5.0E-02	r	0	0.1	12122-67-7	Zineb	3.1E+03	nc	4.4E+04	nc	1.8E+02	nc	1.8E+03	nc		

Appendix C

Risk Characterization Tables

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Outdoor Air
Receptor Population: Worker
Receptor Age: Adults

Table C.1.1. RME
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Outdoor Air

Worker Inhalation

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	**Metals and Organometallic Compounds**													
	Mercury (total)	3.3.E-05	mg/m3	--	3.3.E-05	mg/m3	M	2.1E-6	mg/kg-day	8.6E-5	mg/kg-day	--	--	0.025
													Hazard Index:	0.025

Note:
-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Represents inhalation reference dose for mercury vapor.

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (unpaved)
Receptor Population: Worker
Receptor Age: Adults

Table C.1.2. RME
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	5.9E-3	mg/kg-day	1.0E+0	mg/kg-day	--	--	0.0059
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.018
	Chromium	97	mg/kg	--	97	mg/kg	M	4.7E-5	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.016
	Copper	470	mg/kg	--	470	mg/kg	M	2.3E-4	mg/kg-day	3.7E-2	mg/kg-day	--	--	0.0062
	Iron	23000	mg/kg	--	23000	mg/kg	M	1.1E-2	mg/kg-day	3.0E-1	mg/kg-day	--	--	0.038
	Lead	390	mg/kg	--	390	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	540	mg/kg	--	540	mg/kg	M	2.6E-4	mg/kg-day	4.7E-2	mg/kg-day	--	--	0.0057
	Mercury (total)	310	mg/kg	--	310	mg/kg	M	1.5E-4	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.51
	Thallium	ND	mg/kg	--	ND	mg/kg	M	--	mg/kg-day	8.0E-5	mg/kg-day	--	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	6.8E-5	mg/kg-day	9.0E-3	mg/kg-day	--	--	0.0076
	Organic Compounds													
	Benzene	ND	mg/kg	--	ND	mg/kg	M	--	mg/kg-day	3.0E-3	mg/kg-day	--	--	--
	PAHs													
	Benz[a]anthracene	0.31	mg/kg	--	0.31	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.41	mg/kg	--	0.41	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	0.75	mg/kg	--	0.75	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.071	mg/kg	--	0.071	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.60
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.1E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.0071
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	0.31	mg/kg	0.13	0.31	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.41	mg/kg	0.13	0.41	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	0.75	mg/kg	0.13	0.75	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.071	mg/kg	0.13	0.071	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0071
													Total Hazard Index Across All Exposure Routes/Pathways:	0.61

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (all)
Receptor Population: Worker
Receptor Age: Adults

Table C.1.3. RME
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

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Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	5.9E-3	mg/kg-day	1.0E+0	mg/kg-day	--	--	0.0059
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.018
	Chromium	97	mg/kg	--	97	mg/kg	M	4.7E-5	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.016
	Copper	2200	mg/kg	--	2200	mg/kg	M	1.1E-3	mg/kg-day	3.7E-2	mg/kg-day	--	--	0.029
	Iron	22000	mg/kg	--	22000	mg/kg	M	1.1E-2	mg/kg-day	3.0E-1	mg/kg-day	--	--	0.036
	Lead	260	mg/kg	--	260	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	400	mg/kg	--	400	mg/kg	M	2.0E-4	mg/kg-day	4.7E-2	mg/kg-day	--	--	0.0042
	Mercury (total)	2300	mg/kg	--	2300	mg/kg	M	1.1E-3	mg/kg-day	3.0E-4	mg/kg-day	--	--	3.8
	Thallium	1.8	mg/kg	--	1.8	mg/kg	M	8.8E-7	mg/kg-day	8.0E-5	mg/kg-day	--	--	0.011
	Vanadium	140	mg/kg	--	140	mg/kg	M	6.8E-5	mg/kg-day	9.0E-3	mg/kg-day	--	--	0.0076
	Organic Compounds													
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	1.4E-6	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.0005
	PAHs													
	Benz[a]anthracene	0.85	mg/kg	--	0.85	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.68	mg/kg	--	0.68	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.1	mg/kg	--	1.1	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.15	mg/kg	--	0.15	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	3.9
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.1E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.0071
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	0.85	mg/kg	0.13	0.85	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.68	mg/kg	0.13	0.68	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.1	mg/kg	0.13	1.1	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.15	mg/kg	0.13	0.15	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0071
													Total Hazard Index Across All Exposure Routes/Pathways:	3.9

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Developed Area subsurface soil (1-20 ft depths)
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.4. RME
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Exposure
Developed Area

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Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Arsenic	8.4	mg/kg	--	8.4	mg/kg	M	4.1E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0014
	Barium	320	mg/kg	--	320	mg/kg	M	1.6E-5	mg/kg-day	0.07	mg/kg-day	--	--	0.0002
	Cadmium	3.4	mg/kg	--	3.4	mg/kg	M	1.7E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0003
	Chromium	130	mg/kg	--	130	mg/kg	M	6.4E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0021
	Copper	7400	mg/kg	--	7400	mg/kg	M	3.6E-4	mg/kg-day	0.037	mg/kg-day	--	--	0.010
	Iron	24000	mg/kg	--	24000	mg/kg	M	1.2E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0039
	Lead	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	570	mg/kg	--	570	mg/kg	M	2.8E-5	mg/kg-day	0.047	mg/kg-day	--	--	0.0006
	Mercury (total)	2800	mg/kg	--	2800	mg/kg	M	1.4E-4	mg/kg-day	0.0003	mg/kg-day	--	--	0.46
	Nickel	88	mg/kg	--	88	mg/kg	M	4.3E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0002
	Silver	9.6	mg/kg	--	9.6	mg/kg	M	4.7E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.0001
	Thallium	5.4	mg/kg	--	5.4	mg/kg	M	2.6E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0033
	Zinc	2100	mg/kg	--	2100	mg/kg	M	1.0E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0003
	Organic Compounds													
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	1.4E-7	mg/kg-day	0.003	mg/kg-day	--	--	0.00005
	Toluene	0.011	mg/kg	--	0.011	mg/kg	M	5.4E-10	mg/kg-day	0.20	mg/kg-day	--	--	0.000000003
	PAHs													
	2-Methylnaphthalene	11	mg/kg	--	11	mg/kg	M	5.4E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00003
	Benz[a]anthracene	0.26	mg/kg	--	0.26	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	2.4	mg/kg	--	2.4	mg/kg	M	1.2E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.000006
	Phenanthrene	5.5	mg/kg	--	5.5	mg/kg	M	2.7E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000009
	PCBs	0.36	mg/kg	--	0.36	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.48
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.4	mg/kg	0.03	8.4	mg/kg	M	6.5E-07	mg/kg-day	0.0003	mg/kg-day	--	--	0.0022
	Cadmium	3.4	mg/kg	0.001	3.4	mg/kg	M	8.8E-09	mg/kg-day	0.000013	mg/kg-day	--	--	0.0007
	Organic Compounds													
	PAHs													
	2-Methylnaphthalene	11	mg/kg	0.13	11	mg/kg	M	3.7E-06	mg/kg-day	0.02	mg/kg-day	--	--	0.0002
	Benz[a]anthracene	0.26	mg/kg	0.13	0.26	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	2.4	mg/kg	0.13	2.4	mg/kg	M	8.1E-07	mg/kg-day	0.02	mg/kg-day	--	--	0.00004
	Phenanthrene	5.5	mg/kg	0.13	5.5	mg/kg	M	1.8E-06	mg/kg-day	0.03	mg/kg-day	--	--	0.00006
	PCBs	0.36	mg/kg	0.14	0.36	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0032
													Total Hazard Index Across All Exposure Routes/Pathways:	0.48

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Worker
Receptor Age: Adults

Table C.1.5. RME
Calculation of Noncancer Hazards
Worker Surface Soil Exposure: Reasonable Maximum Exposure
Undeveloped Area

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Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	3.4E-3	mg/kg-day	1.0	mg/kg-day	--	--	0.0034
	Antimony	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	0.0004	mg/kg-day	--	--	0.013
	Arsenic	13	mg/kg	--	13	mg/kg	M	6.4E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.021
	Barium	350	mg/kg	--	350	mg/kg	M	1.7E-4	mg/kg-day	0.070	mg/kg-day	--	--	0.0024
	Cadmium	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	0.0005	mg/kg-day	--	--	0.011
	Chromium	170	mg/kg	--	170	mg/kg	M	8.3E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.028
	Copper	380	mg/kg	--	380	mg/kg	M	1.9E-4	mg/kg-day	0.037	mg/kg-day	--	--	0.0050
	Iron	38000	mg/kg	--	38000	mg/kg	M	1.9E-2	mg/kg-day	0.30	mg/kg-day	--	--	0.062
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	3.0E-4	mg/kg-day	0.05	mg/kg-day	--	--	0.0064
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	2.6E-4	mg/kg-day	0.0003	mg/kg-day	--	--	0.88
	Nickel	63	mg/kg	--	63	mg/kg	M	3.1E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0015
	Silver	15	mg/kg	--	15	mg/kg	M	7.3E-6	mg/kg-day	0.01	mg/kg-day	--	--	0.0015
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	1.4E-6	mg/kg-day	0.0001	mg/kg-day	--	--	0.018
	Vanadium	80	mg/kg	--	80	mg/kg	M	3.9E-5	mg/kg-day	0.01	mg/kg-day	--	--	0.0043
	Zinc	9200	mg/kg	--	9200	mg/kg	M	4.5E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.015
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	4.9E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0024
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	2.0E-6	mg/kg-day	0.03	mg/kg-day	--	--	0.0001
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	1.1
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	2.5E-06	mg/kg-day	0.0003	mg/kg-day	--	--	0.0084
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	7.1E-8	mg/kg-day	0.000013	mg/kg-day	--	--	0.0057
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	6.5E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0032
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	3.4E-6	mg/kg-day	0.03	mg/kg-day	--	--	0.0001
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.017
													Total Hazard Index Across All Exposure Routes/Pathways:	1.1

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sediment
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.6. RME
Calculation of Noncancer Hazards
Adult Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Adult Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	7.7E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0008
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	4.8E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0016
	Barium	230	mg/kg	--	230	mg/kg	M	1.3E-5	mg/kg-day	0.07	mg/kg-day	--	--	0.0002
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	5.0E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0010
	Chromium	160	mg/kg	--	160	mg/kg	M	8.8E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0029
	Copper	190	mg/kg	--	190	mg/kg	M	1.0E-5	mg/kg-day	0.04	mg/kg-day	--	--	0.0003
	Iron	21000	mg/kg	--	21000	mg/kg	M	1.2E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0038
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	9.9E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.0002
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	6.6E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.22
	Nickel	29	mg/kg	--	29	mg/kg	M	1.6E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0001
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	2.4E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.00005
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	2.6E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0033
	Vanadium	69	mg/kg	--	69	mg/kg	M	3.8E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0004
	Zinc	7300	mg/kg	--	7300	mg/kg	M	4.0E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0013
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	9.9E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000003
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.24
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	5.9E-08	mg/kg-day	0.0003	mg/kg-day	--	--	0.0002
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	2.0E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0002
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	5.2E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000002
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0004
													Total Hazard Index Across All Exposure Routes/Pathways:	0.24

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sediment
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.7. RME
Calculation of Noncancer Hazards
Older Child Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Older Child Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	1.1E-3	mg/kg-day	1.0	mg/kg-day	--	--	0.0011
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	6.9E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0023
	Barium	230	mg/kg	--	230	mg/kg	M	1.8E-5	mg/kg-day	0.07	mg/kg-day	--	--	0.0003
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	7.1E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0014
	Chromium	160	mg/kg	--	160	mg/kg	M	1.3E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.0042
	Copper	190	mg/kg	--	190	mg/kg	M	1.5E-5	mg/kg-day	0.04	mg/kg-day	--	--	0.0004
	Iron	21000	mg/kg	--	21000	mg/kg	M	1.6E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0055
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	1.4E-5	mg/kg-day	0.047	mg/kg-day	--	--	0.0003
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	9.4E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.31
	Nickel	29	mg/kg	--	29	mg/kg	M	2.3E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0001
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	3.4E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.0001
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	3.8E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0047
	Vanadium	69	mg/kg	--	69	mg/kg	M	5.4E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0006
	Zinc	7300	mg/kg	--	7300	mg/kg	M	5.7E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0019
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	1.4E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000005
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.34
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	1.8E-07	mg/kg-day	0.0003	mg/kg-day	--	--	0.0006
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	6.3E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0005
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	1.6E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.00001
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0011
													Total Hazard Index Across All Exposure Routes/Pathways:	0.34

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.8. RME
Calculation of Noncancer Hazards
Adult Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Adult Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	3.8E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0004
	Antimony	11	mg/kg	--	11	mg/kg	M	6.0E-7	mg/kg-day	0.0004	mg/kg-day	--	--	0.0015
	Arsenic	13	mg/kg	--	13	mg/kg	M	7.1E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0024
	Barium	350	mg/kg	--	350	mg/kg	M	1.9E-5	mg/kg-day	0.07	mg/kg-day	--	--	0.0003
	Cadmium	11	mg/kg	--	11	mg/kg	M	6.0E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0012
	Chromium	170	mg/kg	--	170	mg/kg	M	9.3E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0031
	Copper	380	mg/kg	--	380	mg/kg	M	2.1E-5	mg/kg-day	0.04	mg/kg-day	--	--	0.0006
	Iron	38000	mg/kg	--	38000	mg/kg	M	2.1E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0069
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	3.3E-5	mg/kg-day	0.047	mg/kg-day	--	--	0.0007
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	3.0E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.10
	Nickel	63	mg/kg	--	63	mg/kg	M	3.5E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0002
	Silver	15	mg/kg	--	15	mg/kg	M	8.2E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.0002
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	1.6E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0020
	Vanadium	80	mg/kg	--	80	mg/kg	M	4.4E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0005
	Zinc	9200	mg/kg	--	9200	mg/kg	M	5.0E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0017
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	5.5E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0003
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	2.2E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.00001
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.12
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	8.7E-08	mg/kg-day	0.0003	mg/kg-day	--	--	0.0003
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	2.4E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0002
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	2.2E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0001
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	1.2E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000004
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0006
													Total Hazard Index Across All Exposure Routes/Pathways:	0.12

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.9. RME
Calculation of Noncancer Hazards
Older Child Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**							7.8E-8						
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	5.5E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0005
	Antimony	11	mg/kg	--	11	mg/kg	M	8.6E-7	mg/kg-day	0.0004	mg/kg-day	--	--	0.0022
	Arsenic	13	mg/kg	--	13	mg/kg	M	1.0E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.0034
	Barium	350	mg/kg	--	350	mg/kg	M	2.7E-5	mg/kg-day	0.07	mg/kg-day	--	--	0.0004
	Cadmium	11	mg/kg	--	11	mg/kg	M	8.6E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0017
	Chromium	170	mg/kg	--	170	mg/kg	M	1.3E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.0044
	Copper	380	mg/kg	--	380	mg/kg	M	3.0E-5	mg/kg-day	0.04	mg/kg-day	--	--	0.0008
	Iron	38000	mg/kg	--	38000	mg/kg	M	3.0E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0099
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	4.8E-5	mg/kg-day	0.047	mg/kg-day	--	--	0.0010
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	4.2E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.14
	Nickel	63	mg/kg	--	63	mg/kg	M	4.9E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0002
	Silver	15	mg/kg	--	15	mg/kg	M	1.2E-6	mg/kg-day	0.005	mg/kg-day	--	--	0.0002
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	2.3E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0028
	Vanadium	80	mg/kg	--	80	mg/kg	M	6.3E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0007
	Zinc	9200	mg/kg	--	9200	mg/kg	M	7.2E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0024
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	7.8E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0004
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	3.1E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.00001
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.17
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	2.7E-07	mg/kg-day	0.0003	mg/kg-day	--	--	0.0009
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	7.6E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0006
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	6.9E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0034
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	3.6E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.00001
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0050
													Total Hazard Index Across All Exposure Routes/Pathways:	0.18

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Undeveloped Area subsurface soil (1-20 ft depths)
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.10. RME
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	6.8E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0007
	Antimony	26	mg/kg	--	26	mg/kg	M	1.3E-6	mg/kg-day	0.0004	mg/kg-day	--	--	0.0032
	Arsenic	23	mg/kg	--	23	mg/kg	M	1.1E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.0038
	Barium	1500	mg/kg	--	1500	mg/kg	M	7.3E-5	mg/kg-day	0.070	mg/kg-day	--	--	0.0010
	Cadmium	11	mg/kg	--	11	mg/kg	M	5.4E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0011
	Chromium	290	mg/kg	--	290	mg/kg	M	1.4E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.0047
	Copper	1400	mg/kg	--	1400	mg/kg	M	6.8E-5	mg/kg-day	0.04	mg/kg-day	--	--	0.0019
	Iron	55000	mg/kg	--	55000	mg/kg	M	2.7E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.0090
	Lead	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	1400	mg/kg	--	1400	mg/kg	M	6.8E-5	mg/kg-day	0.047	mg/kg-day	--	--	0.0015
	Mercury (total)	2000	mg/kg	--	2000	mg/kg	M	9.8E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.33
	Nickel	93	mg/kg	--	93	mg/kg	M	4.5E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0002
	Silver	75	mg/kg	--	75	mg/kg	M	3.7E-6	mg/kg-day	0.005	mg/kg-day	--	--	0.0007
	Thallium	2.8	mg/kg	--	2.8	mg/kg	M	1.4E-7	mg/kg-day	0.00008	mg/kg-day	--	--	0.0017
	Vanadium	130	mg/kg	--	130	mg/kg	M	6.4E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0007
	Zinc	5400	mg/kg	--	5400	mg/kg	M	2.6E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0009
	Organic Compounds													
	Benzene	0.0068	mg/kg	--	0.0068	mg/kg	M	3.3E-10	mg/kg-day	0.003	mg/kg-day	--	--	0.0000001
	Carbazole	0.74	mg/kg	--	0.74	mg/kg	M	--	--	ND	--	--	--	--
	Toluene	0.27	mg/kg	--	0.27	mg/kg	M	1.3E-8	mg/kg-day	0.20	mg/kg-day	--	--	0.00000007
	PAHs													
	2-Methylnaphthalene	0.72	mg/kg	--	0.72	mg/kg	M	3.5E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000002
	Benz[a]anthracene	2.2	mg/kg	--	2.2	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.5	mg/kg	--	2.5	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[ghi]perylene	0.89	mg/kg	--	0.89	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	--	0.80	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.32	mg/kg	--	0.32	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	--	0.86	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	1.4	mg/kg	--	1.4	mg/kg	M	6.8E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000003
	Phenanthrene	3.6	mg/kg	--	3.6	mg/kg	M	1.8E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000006
	PCBs	5.2	mg/kg	--	5.2	mg/kg	M	--	--	ND	--	--	--	--
	Aroclor® 1254	0.55	mg/kg	--	0.55	mg/kg	M	2.7E-8	mg/kg-day	0.00002	mg/kg-day	--	--	0.0013
													Hazard Index:	0.36
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	23	mg/kg	0.03	23	mg/kg	M	1.8E-06	mg/kg-day	0.0003	mg/kg-day	--	--	0.0059
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	2.8E-08	mg/kg-day	0.000013	mg/kg-day	--	--	0.0023
	Organic Compounds													
	Carbazole	0.74	mg/kg	0.10	0.74	mg/kg	M	--	--	ND	--	--	--	--
	PAHs													
	2-Methylnaphthalene	0.72	mg/kg	0.13	0.72	mg/kg	M	2.4E-07	mg/kg-day	0.02	mg/kg-day	--	--	0.00001
	Benz[a]anthracene	2.2	mg/kg	0.13	2.2	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.5	mg/kg	0.13	2.5	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[ghi]perylene	0.89	mg/kg	0.13	0.89	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	0.13	0.80	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.32	mg/kg	0.13	0.32	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	0.13	0.86	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	1.4	mg/kg	0.13	1.4	mg/kg	M	4.7E-07	mg/kg-day	0.02	mg/kg-day	--	--	0.00002
	Phenanthrene	3.6	mg/kg	0.13	3.6	mg/kg	M	1.2E-06	mg/kg-day	0.03	mg/kg-day	--	--	0.00004
	PCBs	5.2	mg/kg	0.14	5.2	mg/kg	M	--	--	ND	--	--	--	--
	Aroclor® 1254	0.55	mg/kg	0.14	0.55	mg/kg	M	2.0E-07	mg/kg-day	0.00002	mg/kg-day	--	--	0.010
													Hazard Index:	0.018
													Total Hazard Index Across All Exposure Routes/Pathways:	0.38

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.11. RME
Calculation of Noncancer Hazards
Adult Surface Water Exposure: Reasonable Maximum Recreational Scenario
Operable Unit 1

Adult Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	--	2.6	mg/L	M	1.7E-5	mg/kg-day	0.30	mg/kg-day	--	--	0.00006
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	2.7E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.00006
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	1.2E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0004
													Hazard Index:	0.0005
Dermal	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	8.3E-6	mg/kg-day	0.0030	mg/kg-day	--	--	0.003
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	1.3E-6	mg/kg-day	0.0019	mg/kg-day	--	--	0.0007
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	5.7E-8	mg/kg-day	0.000021	mg/kg-day	--	--	0.0027
														0.0062
														0.0067

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Older child

Table C.1.12. RME
Calculation of Noncancer Hazards
Adult Surface Water Exposure: Reasonable Maximum Recreational Scenario
Operable Unit 1

Older Child Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	--	2.6	mg/L	M	2.4E-5	mg/kg-day	0.300	mg/kg-day	--	--	0.00008
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	3.9E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.00008
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	1.7E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0006
													Hazard Index:	0.0007
Dermal	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	9.0E-6	mg/kg-day	0.0030	mg/kg-day	--	--	0.0030
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	1.4E-6	mg/kg-day	0.002	mg/kg-day	--	--	0.0008
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	6.2E-8	mg/kg-day	0.00002	mg/kg-day	--	--	0.0030
														0.0067
														0.0074

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater
Exposure Point: Groundwater sitewide
Receptor Population: Worker
Receptor Age: Adult

Table C.1.13. RME
Calculation of Noncancer Hazards
Adult Groundwater Exposure: Reasonable Maxium Scenario
Groundwater

Adult Groundwater Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Arsenic	0.0052	mg/L	--	0.0052	mg/L	M	5.1E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.17
	Barium	0.52	mg/L	--	0.52	mg/L	M	5.1E-3	mg/kg-day	0.07	mg/kg-day	--	--	0.073
	Cadmium	0.0038	mg/L	--	0.0038	mg/L	M	3.7E-5	mg/kg-day	0.0005	mg/kg-day	--	--	0.074
	Copper	0.018	mg/L	--	0.018	mg/L	M	1.8E-4	mg/kg-day	0.037	mg/kg-day	--	--	0.0048
	Iron	16	mg/L	--	16	mg/L	M	1.6E-1	mg/kg-day	0.300	mg/kg-day	--	--	0.52
	Manganese	4.8	mg/L	--	4.8	mg/L	M	4.7E-2	mg/kg-day	0.047	mg/kg-day	--	--	1.0
	Mercury (total)	0.028	mg/L	--	0.028	mg/L	M	2.7E-4	mg/kg-day	0.0003	mg/kg-day	--	--	0.91
	Nickel	0.020	mg/L	--	0.02	mg/L	M	2.0E-4	mg/kg-day	0.02	mg/kg-day	--	--	0.010
	Thallium	0.0039	mg/L	--	0.0039	mg/L	M	3.8E-5	mg/kg-day	0.00008	mg/kg-day	--	--	0.48
	Vanadium	0.025	mg/L	--	0.025	mg/L	M	2.4E-4	mg/kg-day	0.009	mg/kg-day	--	--	0.027
	Organic Compounds													
	Acetone	0.10	mg/L	--	0.10	mg/L	M	9.8E-4	mg/kg-day	0.1	mg/kg-day	--	--	0.010
	Benzene	0.019	mg/L	--	0.019	mg/L	M	1.9E-4	mg/kg-day	0.003	mg/kg-day	--	--	0.062
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	--	0.006	mg/L	M	5.9E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0029
	Chlorobenzene	0.0064	mg/L	--	0.0064	mg/L	M	6.3E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0031
	Chloroethane	0.0078	mg/L	--	0.0078	mg/L	M	7.6E-5	mg/kg-day	0.4	mg/kg-day	--	--	0.0002
	1,2-Dichloroethene, isomers	0.012	mg/L	--	0.012	mg/L	M	1.2E-4	mg/kg-day	0.02	mg/kg-day	--	--	0.0059
	1,4-Dichlorobenzene	0.004	mg/L	--	0.004	mg/L	M	3.9E-5	mg/kg-day	0.03	mg/kg-day	--	--	0.0013
	4-Methyl-2-pentanone	0.0095	mg/L	--	0.0095	mg/L	M	9.3E-5	mg/kg-day	0.08	mg/kg-day	--	--	0.0012
	4-Methylphenol	0.013	mg/L	--	0.013	mg/L	M	1.3E-4	mg/kg-day	0.005	mg/kg-day	--	--	0.025
	Toluene	0.039	mg/L	--	0.039	mg/L	M	3.8E-4	mg/kg-day	0.2	mg/kg-day	--	--	0.0019
	Xylene	0.058	mg/L	--	0.058	mg/L	M	5.7E-4	mg/kg-day	2	mg/kg-day	--	--	0.0003
	PAHs													
	2-Methylnaphthalene	0.001	mg/L	--	0.001	mg/L	M	9.8E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0005
	Naphthalene	0.017	mg/L	--	0.017	mg/L	M	1.7E-4	mg/kg-day	0.02	mg/kg-day	--	--	0.0083
													Hazard Index:	3.4
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	0.0052	mg/L	0.001	0.0052	mg/L	M	2.0E-9	mg/kg-day	0.0003	mg/kg-day	--	--	0.000007
	Barium	0.52	mg/L	0.001	0.52	mg/L	M	2.0E-7	mg/kg-day	0.0049	mg/kg-day	--	--	0.00004
	Cadmium	0.0038	mg/L	0.001	0.0038	mg/L	M	1.4E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0001
	Copper	0.018	mg/L	0.001	0.018	mg/L	M	6.8E-9	mg/kg-day	0.00037	mg/kg-day	--	--	0.00002
	Iron	16	mg/L	0.001	16	mg/L	M	6.0E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0020
	Manganese	4.8	mg/L	0.001	4.8	mg/L	M	1.8E-6	mg/kg-day	0.00186667	mg/kg-day	--	--	0.0010
	Mercury (total)	0.028	mg/L	0.001	0.028	mg/L	M	1.1E-8	mg/kg-day	0.000021	mg/kg-day	--	--	0.0005
	Nickel	0.020	mg/L	0.0002	0.020	mg/L	M	1.5E-9	mg/kg-day	0.0008	mg/kg-day	--	--	0.000002
	Thallium	0.0039	mg/L	0.001	0.0039	mg/L	M	1.5E-9	mg/kg-day	0.00008	mg/kg-day	--	--	0.00002
	Vanadium	0.025	mg/L	0.001	0.025	mg/L	M	9.4E-9	mg/kg-day	0.00023	mg/kg-day	--	--	0.00004
	Organic Compounds													
	Acetone	0.10	mg/L	0.0014	0.10	mg/L	M	5.3E-8	mg/kg-day	0.1	mg/kg-day	--	--	0.0000005
	Benzene	0.019	mg/L	0.015	0.019	mg/L	M	1.1E-7	mg/kg-day	0.003	mg/kg-day	--	--	0.00004
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	0.025	0.006	mg/L	M	5.7E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000003
	Chlorobenzene	0.0064	mg/L	0.029	0.0064	mg/L	M	7.0E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000004
	Chloroethane	0.0078	mg/L	0.0047	0.0078	mg/L	M	1.4E-8	mg/kg-day	0.4	mg/kg-day	--	--	0.00000003
	1,2-Dichloroethene, isomers	0.012	mg/L	0.0079	0.012	mg/L	M	3.6E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000002
	1,4-Dichlorobenzene	0.004	mg/L	0.043	0.004	mg/L	M	6.5E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000002
	4-Methyl-2-pentanone	0.0095	mg/L	0.000036	0.0095	mg/L	M	1.3E-10	mg/kg-day	0.08	mg/kg-day	--	--	0.000000002
	4-Methylphenol	0.013	mg/L	0.040	0.013	mg/L	M	2.0E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.00004
	Toluene	0.039	mg/L	0.012	0.039	mg/L	M	1.8E-7	mg/kg-day	0.2	mg/kg-day	--	--	0.0000009
	Xylene	0.058	mg/L	0.054	0.058	mg/L	M	1.2E-6	mg/kg-day	2	mg/kg-day	--	--	0.0000006
	PAHs													
	2-Methylnaphthalene	0.001	mg/L	0.048	0.001	mg/L	M	1.8E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.0000009
	Naphthalene	0.017	mg/L	0.048	0.017	mg/L	M	3.1E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00002
													Hazard Index:	0.0038
													Total Hazard Index Across All Exposure Routes/Pathways:	3.4

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Outdoor Air
Receptor Population: Worker
Receptor Age: Adults

Table C.1.14. RME
Calculation of Cancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Inhalation	**Metals and Organometallic Compounds**											
	Mercury (total)	3.3E-05	mg/kg	--	3.3E-05	mg/kg	M	--	--	ND	--	--
											Total Risk:	0E+0

Note:
-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Represents cancer slope factor for mercury vapor.

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (unpaved)
Receptor Population: Worker
Receptor Age: Adults

Table C.1.15. RME
Calculation of Cancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

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Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	--	--	ND	--	--
	Arsenic	11	mg/kg	--	11	mg/kg	M	1.9E-6	mg/kg-day	1.5	(mg/kg-day)-1	3E-6
	Chromium	97	mg/kg	--	97	mg/kg	M	--	--	ND	--	--
	Copper	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Iron	23000	mg/kg	--	23000	mg/kg	M	--	--	ND	--	--
	Lead	390	mg/kg	--	390	mg/kg	M	--	--	ND	--	--
	Manganese	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Mercury (total)	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--
	Thallium	ND	mg/kg	--	ND	mg/kg	M	--	--	ND	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	ND	mg/kg	--	ND	mg/kg	M	--	mg/kg-day	0.055	(mg/kg-day)-1	--
	PAHs											
	Benz[a]anthracene	0.31	mg/kg	--	0.31	mg/kg	M	5.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	4E-8
	Benzo[a]pyrene	0.41	mg/kg	--	0.41	mg/kg	M	7.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	5E-7
	Benzo[b]fluoranthene	0.75	mg/kg	--	0.75	mg/kg	M	1.3E-7	mg/kg-day	0.73	(mg/kg-day)-1	1E-7
	Dibenz[a,h]anthracene	0.071	mg/kg	--	0.071	mg/kg	M	1.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	9E-8
											Total Risk:	4E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	7.6E-7	mg/kg-day	1.5	(mg/kg-day)-1	1E-6
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	0.31	mg/kg	0.13	0.31	mg/kg	M	9.3E-8	mg/kg-day	0.73	(mg/kg-day)-1	7E-8
	Benzo[a]pyrene	0.41	mg/kg	0.13	0.41	mg/kg	M	1.2E-7	mg/kg-day	7.3	(mg/kg-day)-1	9E-7
	Benzo[b]fluoranthene	0.75	mg/kg	0.13	0.75	mg/kg	M	2.2E-7	mg/kg-day	0.73	(mg/kg-day)-1	2E-7
	Dibenz[a,h]anthracene	0.071	mg/kg	0.13	0.071	mg/kg	M	2.1E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
											Total Risk:	2E-6
											Total Risk Across all Exposure Pathways:	6E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (all)
Receptor Population: Worker
Receptor Age: Adults

Table C.1.16. RME
Calculation of Cancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

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Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	--	--	ND	--	--
	Arsenic	11	mg/kg	--	11	mg/kg	M	1.9E-6	mg/kg-day	1.5	(mg/kg-day)-1	3E-6
	Chromium	97	mg/kg	--	97	mg/kg	M	--	--	ND	--	--
	Copper	2200	mg/kg	--	2200	mg/kg	M	--	--	ND	--	--
	Iron	22000	mg/kg	--	22000	mg/kg	M	--	--	ND	--	--
	Lead	260	mg/kg	--	260	mg/kg	M	--	--	ND	--	--
	Manganese	400	mg/kg	--	400	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2300	mg/kg	--	2300	mg/kg	M	--	--	ND	--	--
	Thallium	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	4.9E-7	mg/kg-day	0.055	(mg/kg-day)-1	3E-8
	PAHs											
	Benz[a]anthracene	0.85	mg/kg	--	0.85	mg/kg	M	1.5E-7	mg/kg-day	0.73	(mg/kg-day)-1	1E-7
	Benzo[a]pyrene	0.68	mg/kg	--	0.68	mg/kg	M	1.2E-7	mg/kg-day	7.3	(mg/kg-day)-1	9E-7
	Benzo[b]fluoranthene	1.1	mg/kg	--	1.1	mg/kg	M	1.9E-7	mg/kg-day	0.73	(mg/kg-day)-1	1E-7
	Dibenz[a,h]anthracene	0.15	mg/kg	--	0.15	mg/kg	M	2.6E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
											Total Risk:	4E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	7.6E-7	mg/kg-day	1.5	(mg/kg-day)-1	1E-6
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	0.85	mg/kg	0.13	0.85	mg/kg	M	2.5E-7	mg/kg-day	0.73	(mg/kg-day)-1	2E-7
	Benzo[a]pyrene	0.68	mg/kg	0.13	0.68	mg/kg	M	2.0E-7	mg/kg-day	7.3	(mg/kg-day)-1	1E-6
	Benzo[b]fluoranthene	1.1	mg/kg	0.13	1.1	mg/kg	M	3.3E-7	mg/kg-day	0.73	(mg/kg-day)-1	2E-7
	Dibenz[a,h]anthracene	0.15	mg/kg	0.13	0.15	mg/kg	M	4.5E-8	mg/kg-day	7.3	(mg/kg-day)-1	3E-7
											Total Risk:	3E-6
											Total Risk Across all Exposure Pathways:	8E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Developed Area subsurface soil (1-20 ft depths)
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.17. RME
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Exposure
Developed Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Arsenic	8.4	mg/kg	--	8.4	mg/kg	M	1.2E-8	mg/kg-day	1.5	(mg/kg-day)-1	2E-8
	Barium	320	mg/kg	--	320	mg/kg	M	--	--	ND	--	--
	Cadmium	3.4	mg/kg	--	3	mg/kg	M	--	--	ND	--	--
	Chromium	130	mg/kg	--	130	mg/kg	M	--	--	ND	--	--
	Copper	7400	mg/kg	--	7400	mg/kg	M	--	--	ND	--	--
	Iron	24000	mg/kg	--	24000	mg/kg	M	--	--	ND	--	--
	Lead	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--
	Manganese	570	mg/kg	--	570	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2800	mg/kg	--	2800	mg/kg	M	--	--	ND	--	--
	Nickel	88	mg/kg	--	88	mg/kg	M	--	--	ND	--	--
	Silver	9.6	mg/kg	--	9.6	mg/kg	M	--	--	ND	--	--
	Thallium	5.4	mg/kg	--	5.4	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	3.9E-9	mg/kg-day	0.055	(mg/kg-day)-1	2E-10
	Toluene	0.011	mg/kg	--	0.011	mg/kg	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	0.26	mg/kg	--	0.26	mg/kg	M	3.6E-10	mg/kg-day	0.73	(mg/kg-day)-1	3E-10
	Naphthalene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	5.5	mg/kg	--	5.5	mg/kg	M	--	--	ND	--	--
	PCBs	0.36	mg/kg	--	0.36	mg/kg	M	5.0E-10	mg/kg-day	2.0	(mg/kg-day)-1	1E-9
											Total Risk:	2E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.4	mg/kg	0.03	8.4	mg/kg	M	1.9E-08	mg/kg-day	1.5	(mg/kg-day)-1	2.8E-08
	Cadmium	3.4	mg/kg	0.001	3.4	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	2-Methylnaphthalene	11	mg/kg	0.13	11	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	0.26	mg/kg	0.13	0.26	mg/kg	M	2.5E-09	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Naphthalene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	5.5	mg/kg	0.13	5.5	mg/kg	M	--	--	ND	--	--
	PCBs	0.36	mg/kg	0.14	0.36	mg/kg	M	3.7E-09	mg/kg-day	2.0	(mg/kg-day)-1	7E-9
											Total Risk:	4E-8
											Total Risk Across all Exposure Pathways:	6E-8

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Worker
Receptor Age: Adults

Table C.1.18. RME
Calculation of Cancer Risks
Worker Surface Soil Exposure: Reasonable Maximum Exposure
Undeveloped Area

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Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	2.3E-6	mg/kg-day	1.5	(mg/kg-day)-1	3E-6
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	1.7E-5	mg/kg-day	0.014	(mg/kg-day)-1	2E-7
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	3.0E-7	mg/kg-day	0.73	(mg/kg-day)-1	2E-7
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	3.7E-7	mg/kg-day	7.3	(mg/kg-day)-1	3E-6
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	4.2E-7	mg/kg-day	0.73	(mg/kg-day)-1	3E-7
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	8.7E-8	mg/kg-day	7.3	(mg/kg-day)-1	6E-7
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	2.1E-7	mg/kg-day	0.73	(mg/kg-day)-1	2E-7
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	7.7E-7	mg/kg-day	2.0	(mg/kg-day)-1	2E-6
											Total Risk:	9E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	9.0E-07	mg/kg-day	1.5	(mg/kg-day)-1	1E-6
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.1	100	mg/kg	M	2.3E-05	mg/kg-day	0.014	(mg/kg-day)-1	3E-7
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	5.1E-7	mg/kg-day	0.73	(mg/kg-day)-1	4E-7
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	6.3E-7	mg/kg-day	7.3	(mg/kg-day)-1	5E-6
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	7.2E-7	mg/kg-day	0.73	(mg/kg-day)-1	5E-7
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	1.5E-7	mg/kg-day	7.3	(mg/kg-day)-1	1E-6
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.20	mg/kg	M	3.6E-7	mg/kg-day	0.73	(mg/kg-day)-1	3E-7
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	1.4E-6	mg/kg-day	2.0	(mg/kg-day)-1	3E-6
											Total Risk:	1E-5
											Total Risk Across all Exposure Pathways:	2E-5

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sediment
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.19. RME
Calculation of Cancer Risks
Adult Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Adult Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	2.1E-7	mg/kg-day	1.5	(mg/kg-day)-1	3E-7
	Barium	230	mg/kg	--	230	mg/kg	M	--	--	ND	--	--
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	--	--	ND	--	--
	Chromium	160	mg/kg	--	160	mg/kg	M	--	--	ND	--	--
	Copper	190	mg/kg	--	190	mg/kg	M	--	--	ND	--	--
	Iron	21000	mg/kg	--	21000	mg/kg	M	--	--	ND	--	--
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	--	--	ND	--	--
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	--	--	ND	--	--
	Nickel	29	mg/kg	--	29	mg/kg	M	--	--	ND	--	--
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	--	--	ND	--	--
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	--	--	ND	--	--
	Vanadium	69	mg/kg	--	69	mg/kg	M	--	--	ND	--	--
	Zinc	7300	mg/kg	--	7300	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	4.0E-8	mg/kg-day	0.73	(mg/kg-day)-1	3E-8
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	3.8E-8	mg/kg-day	7.3	(mg/kg-day)-1	3E-7
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	4.2E-8	mg/kg-day	0.73	(mg/kg-day)-1	3E-8
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	1.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	8E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	2.8E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	1.7E-8	mg/kg-day	2.0	(mg/kg-day)-1	3E-8
											Total Risk:	8E-7
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	2.5E-08	mg/kg-day	1.5	(mg/kg-day)-1	4E-8
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	2.1E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	2.0E-8	mg/kg-day	7.3	(mg/kg-day)-1	1E-7
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	2.2E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	6.1E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	9.7E-9	mg/kg-day	2.0	(mg/kg-day)-1	2E-8
											Total Risk:	3E-7
											Total Risk Across all Exposure Pathways:	1E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sediment
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.20. RME
Calculation of Cancer Risks
Older Child Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	8.9E-8	mg/kg-day	1.5	(mg/kg-day)-1	1E-7
	Barium	230	mg/kg	--	230	mg/kg	M	--	--	ND	--	--
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	--	--	ND	--	--
	Chromium	160	mg/kg	--	160	mg/kg	M	--	--	ND	--	--
	Copper	190	mg/kg	--	190	mg/kg	M	--	--	ND	--	--
	Iron	21000	mg/kg	--	21000	mg/kg	M	--	--	ND	--	--
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	--	--	ND	--	--
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	--	--	ND	--	--
	Nickel	29	mg/kg	--	29	mg/kg	M	--	--	ND	--	--
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	--	--	ND	--	--
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	--	--	ND	--	--
	Vanadium	69	mg/kg	--	69	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	1.7E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	1.6E-8	mg/kg-day	7.3	(mg/kg-day)-1	1E-7
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	1.8E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	4.9E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	1.2E-8	mg/kg-day	0.73	(mg/kg-day)-1	9E-9
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	7.3E-9	mg/kg-day	2.0	(mg/kg-day)-1	1E-8
											Total Risk:	3E-7
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	2.3E-08	mg/kg-day	1.5	(mg/kg-day)-1	4E-08
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	2.0E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-08
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	1.8E-8	mg/kg-day	7.3	(mg/kg-day)-1	1E-7
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	2.1E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	5.6E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	9.1E-9	mg/kg-day	2.0	(mg/kg-day)-1	2E-8
											Total Risk:	3E-7
											Total Risk Across all Exposure Pathways:	6E-7

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.21. RME
Calculation of Cancer Risks
Adult Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Adult Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	3.1E-7	mg/kg-day	1.5	(mg/kg-day)-1	5E-7
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	2.3E-6	mg/kg-day	0.014	(mg/kg-day)-1	3E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	4.0E-8	mg/kg-day	0.73	(mg/kg-day)-1	3E-8
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	4.9E-8	mg/kg-day	7.3	(mg/kg-day)-1	4E-7
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	5.6E-8	mg/kg-day	0.73	(mg/kg-day)-1	4E-8
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	1.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	9E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	2.8E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	1.0E-7	mg/kg-day	2.0	(mg/kg-day)-1	2E-7
											Total Risk:	1E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	3.7E-08	mg/kg-day	1.5	(mg/kg-day)-1	6E-8
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	9.5E-7	mg/kg-day	0.014	(mg/kg-day)-1	1E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	2.1E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	2.6E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	3.0E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	6.2E-9	mg/kg-day	7.3	(mg/kg-day)-1	5E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.1	4.4	mg/kg	M	5.9E-08	mg/kg-day	2.0	(mg/kg-day)-1	1E-7
											Total Risk:	5E-7
											Total Risk Across all Exposure Pathways:	2E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.22. RME
Calculation of Cancer Risks
Older Child Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Older Child Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	1.3E-7	mg/kg-day	1.5	(mg/kg-day)-1	2E-7
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	1.0E-6	--	0.014	--	1E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	1.7E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	2.1E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	2.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	5.0E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	1.2E-8	mg/kg-day	0.73	(mg/kg-day)-1	9E-9
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	4.4E-8	mg/kg-day	2.0	(mg/kg-day)-1	9E-8
											Total Risk:	5E-7
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	3.5E-08	mg/kg-day	1.5	(mg/kg-day)-1	5E-08
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	8.9E-6	mg/kg-day	0.014	(mg/kg-day)-1	1E-7
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	2.0E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	2.4E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	2.8E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	5.8E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	5.5E-8	mg/kg-day	2.0	(mg/kg-day)-1	1E-7
											Total Risk:	5E-7
											Total Risk Across all Exposure Pathways:	1E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Undeveloped Area subsurface soil (1-20 ft depths)
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.23. RME
Calculation of Cancer Risks
Adult Subsurface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

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Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Antimony	26	mg/kg	--	26	mg/kg	M	--	--	ND	--	--
	Arsenic	23	mg/kg	--	23	mg/kg	M	3.2E-8	mg/kg-day	1.5	(mg/kg-day)-1	5E-8
	Barium	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	290	mg/kg	--	290	mg/kg	M	--	--	ND	--	--
	Copper	1400	mg/kg	--	1400	mg/kg	M	--	--	ND	--	--
	Iron	55000	mg/kg	--	55000	mg/kg	M	--	--	ND	--	--
	Lead	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--
	Manganese	1400	mg/kg	--	1400	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2000	mg/kg	--	2000	mg/kg	M	--	--	ND	--	--
	Nickel	93	mg/kg	--	93	mg/kg	M	--	--	ND	--	--
	Silver	75	mg/kg	--	75	mg/kg	M	--	--	ND	--	--
	Thallium	2.8	mg/kg	--	2.8	mg/kg	M	--	--	ND	--	--
	Vanadium	130	mg/kg	--	130	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	0.0068	mg/kg	--	0.0068	mg/kg	M	9.5E-12	mg/kg-day	0.06	(mg/kg-day)-1	5E-13
	Carbazole	0.74	mg/kg	--	0.74	mg/kg	M	1.0E-9	mg/kg-day	0.02	(mg/kg-day)-1	2E-11
	Toluene	0.27	mg/kg	--	0.27	mg/kg	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.72	mg/kg	--	0.72	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	2.2	mg/kg	--	2.2	mg/kg	M	3.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	1.7	mg/kg	--	1.7	mg/kg	M	2.4E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
	Benzo[b]fluoranthene	2.5	mg/kg	--	2.5	mg/kg	M	3.5E-9	mg/kg-day	0.73	(mg/kg-day)-1	3E-9
	Benzo[ghi]perylene	0.89	mg/kg	--	0.89	mg/kg	M	--	--	ND	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	--	0.80	mg/kg	M	1.1E-9	mg/kg-day	0.073	(mg/kg-day)-1	8E-11
	Dibenz[a,h]anthracene	0.32	mg/kg	--	0.32	mg/kg	M	4.5E-10	mg/kg-day	7.3	(mg/kg-day)-1	3E-9
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	--	0.86	mg/kg	M	1.2E-9	mg/kg-day	0.73	(mg/kg-day)-1	9E-10
	Naphthalene	1.4	mg/kg	--	1.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	3.6	mg/kg	--	3.6	mg/kg	M	--	--	ND	--	--
	PCBs	5.2	mg/kg	--	5.2	mg/kg	M	7.3E-9	mg/kg-day	2.0	(mg/kg-day)-1	1E-8
	Aroclor® 1254	0.55	mg/kg	--	0.55	mg/kg	M	--	--	ND	--	--
											Total Risk:	9E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	23	mg/kg	0.03	23	mg/kg	M	5.1E-8	mg/kg-day	1.5	(mg/kg-day)-1	8E-08
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Carbazole	0.74	mg/kg	0.10	0.74	mg/kg	M	5.5E-9	mg/kg-day	0.02	(mg/kg-day)-1	1E-10
	PAHs											
	2-Methylnaphthalene	0.72	mg/kg	0.13	0.72	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	2.2	mg/kg	0.13	2.2	mg/kg	M	2.1E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Benzo[a]pyrene	1.7	mg/kg	0.13	1.7	mg/kg	M	1.6E-8	mg/kg-day	7.3	(mg/kg-day)-1	1E-7
	Benzo[b]fluoranthene	2.5	mg/kg	0.13	2.5	mg/kg	M	2.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Benzo[ghi]perylene	0.89	mg/kg	0.13	0.89	mg/kg	M	--	--	ND	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	0.13	0.80	mg/kg	M	7.7E-9	mg/kg-day	0.073	(mg/kg-day)-1	6E-10
	Dibenz[a,h]anthracene	0.32	mg/kg	0.13	0.32	mg/kg	M	3.1E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	0.13	0.86	mg/kg	M	8.3E-9	mg/kg-day	0.73	(mg/kg-day)-1	6E-9
	Naphthalene	1.4	mg/kg	0.13	1.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	3.6	mg/kg	0.13	3.6	mg/kg	M	--	--	ND	--	--
	PCBs	5.2	mg/kg	0.14	5.2	mg/kg	M	5.4E-8	mg/kg-day	2.0	(mg/kg-day)-1	1E-7
	Aroclor® 1254	0.55	mg/kg	0.14	0.55	mg/kg	M	--	--	ND	--	--
											Total Risk:	4E-7
											Total Risk Across all Exposure Pathways:	5E-7

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.24. RME
Calculation of Cancer Risks
Adult Surface Water Exposure: Reasonable Maximum Scenario
Operable Unit 1

Adult Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	--	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
											Total Risk:	0E+0
Dermal	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
												0E+0
												0E+0

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

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Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Older child

Table C.1.25. RME
Calculation of Cancer Risks
Older Child Surface Water Exposure: Reasonable Maximum Scenario
Operable Unit 1

Older Child Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	--	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
											Total Risk:	0E+0
Dermal	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
												0E+0
												0E+0

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater
Exposure Point: Groundwater sitewide
Receptor Population: Worker
Receptor Age: Adult

Table C.1.26 RME
Calculation of Cancer Risks
Worker Groundwater Exposure: Reasonable Maximum Scenario
Groundwater

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Adult Groundwater Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Arsenic	0.0052	mg/L	--	0.0052	mg/L	M	1.8E-5	mg/kg-day	1.5	(mg/kg-day)-1	2.7E-5
	Barium	0.52	mg/L	--	0.52	mg/L	M	--	--	ND	--	--
	Cadmium	0.0038	mg/L	--	0.0038	mg/L	M	--	--	ND	--	--
	Copper	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
	Iron	16	mg/L	--	16	mg/L	M	--	--	ND	--	--
	Manganese	4.8	mg/L	--	4.8	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.028	mg/L	--	0.028	mg/L	M	--	--	ND	--	--
	Nickel	0.02	mg/L	--	0.02	mg/L	M	--	--	ND	--	--
	Thallium	0.0039	mg/L	--	0.0039	mg/L	M	--	--	ND	--	--
	Vanadium	0.025	mg/L	--	0.025	mg/L	M	--	--	ND	--	--
	Organic Compounds											
	Acetone	0.10	mg/L	--	0.10	mg/L	M	--	--	ND	--	--
	Benzene	0.019	mg/L	--	0.019	mg/L	M	6.6E-5	mg/kg-day	0.055	(mg/kg-day)-1	3.7E-6
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	--	0.006	mg/L	M	2.1E-5	mg/kg-day	0.014	(mg/kg-day)-1	2.9E-7
	Chlorobenzene	0.0064	mg/L	--	0.0064	mg/L	M	--	--	ND	--	--
	Chloroethane	0.0078	mg/L	--	0.0078	mg/L	M	2.7E-5	mg/kg-day	0.0029	(mg/kg-day)-1	7.9E-8
	1,2-Dichloroethene, isomers	0.012	mg/L	--	0.012	mg/L	M	--	--	ND	--	--
	1,4-Dichlorobenzene	0.004	mg/L	--	0.004	mg/L	M	1.4E-5	mg/kg-day	0.024	(mg/kg-day)-1	3.4E-7
	4-Methyl-2-pentanone	0.0095	mg/L	--	0.0095	mg/L	M	--	--	ND	--	--
	4-Methylphenol	0.013	mg/L	--	0.013	mg/L	M	--	--	ND	--	--
	Toluene	0.039	mg/L	--	0.039	mg/L	M	--	--	ND	--	--
	Xylene	0.058	mg/L	--	0.058	mg/L	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.0010	mg/L	--	0.0010	mg/L	M	--	--	ND	--	--
	4-Methylphenol	0.017	mg/L	--	0.017	mg/L	M	--	--	ND	--	--
											Total Risk:	3.E-05
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	0.0052	mg/L	0.001	0.0052	mg/L	M	4.8E-10	mg/kg-day	1.5	(mg/kg-day)-1	7.2E-10
	Barium	0.52	mg/L	0.001	0.52	mg/L	M	--	--	ND	--	--
	Cadmium	0.0038	mg/L	0.001	0.0038	mg/L	M	--	--	ND	--	--
	Copper	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
	Iron	16	mg/L	0.001	16	mg/L	M	--	--	ND	--	--
	Manganese	4.8	mg/L	0.001	4.8	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.028	mg/L	0.001	0.028	mg/L	M	--	--	ND	--	--
	Nickel	0.02	mg/L	0.0002	0.02	mg/L	M	--	--	ND	--	--
	Thallium	0.0039	mg/L	0.001	0.0039	mg/L	M	--	--	ND	--	--
	Vanadium	0.025	mg/L	0.001	0.025	mg/L	M	--	--	ND	--	--
	Organic Compounds											
	Acetone	0.10	mg/L	0.0014	0.10	mg/L	M	--	--	ND	--	--
	Benzene	0.019	mg/L	0.015	0.019	mg/L	M	2.6E-8	mg/kg-day	0.055	(mg/kg-day)-1	1.4E-9
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	0.025	0.006	mg/L	M	1.4E-8	mg/kg-day	0.014	(mg/kg-day)-1	1.9E-10
	Chlorobenzene	0.0064	mg/L	0.029	0.0064	mg/L	M	--	--	ND	--	--
	Chloroethane	0.0078	mg/L	0.0047	0.0078	mg/L	M	3.4E-9	mg/kg-day	0.0029	(mg/kg-day)-1	9.8E-12
	1,2-Dichloroethene, isomers	0.012	mg/L	0.0079	0.012	mg/L	M	--	--	ND	--	--
	1,4-Dichlorobenzene	0.004	mg/L	0.043	0.004	mg/L	M	1.6E-8	mg/kg-day	0.024	(mg/kg-day)-1	3.8E-10
	4-Methyl-2-pentanone	0.0095	mg/L	0.000036	0.0095	mg/L	M	--	--	ND	--	--
	4-Methylphenol	0.013	mg/L	0.04	0.013	mg/L	M	--	--	ND	--	--
	Toluene	0.039	mg/L	0.012	0.039	mg/L	M	--	--	ND	--	--
	Xylene	0.058	mg/L	0.054	0.058	mg/L	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.0010	mg/L	0.048	0.0010	mg/L	M	--	--	ND	--	--
	Naphthalene	0.017	mg/L	0.048	0.017	mg/L	M	--	--	ND	--	--
											Total Risk:	3E-9
											Total Risk Across all Exposure Pathways:	3E-5

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Outdoor Air
Receptor Population: Worker
Receptor Age: Adults

Table C.1.1. Typical
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Outdoor Air

Worker Inhalation

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	**Metals and Organometallic Compounds**													
	Mercury (total)	3.3.E-05	mg/m3	--	3.3.E-05	mg/m3	M	4.2E-7	mg/kg-day	8.6E-5	mg/kg-day	8.6E-5	mg/kg-day	0.0049
													Hazard Index:	0.0049

Note:
-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration
[b]Absorption factors from U.S. EPA (1999a).
[c]Represents inhalation reference dose for mercury vapor

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (unpaved
Receptor Population: Worker
Receptor Age: Adults

Table C.1.2. Typical
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	5.9E-3	mg/kg-day	1.0E+0	mg/kg-day	--	--	0.0059
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.018
	Chromium	97	mg/kg	--	97	mg/kg	M	4.7E-5	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.016
	Copper	470	mg/kg	--	470	mg/kg	M	2.3E-4	mg/kg-day	3.7E-2	mg/kg-day	--	--	0.0062
	Iron	23000	mg/kg	--	23000	mg/kg	M	1.1E-2	mg/kg-day	3.0E-1	mg/kg-day	--	--	0.038
	Lead	390	mg/kg	--	390	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	540	mg/kg	--	540	mg/kg	M	2.6E-4	mg/kg-day	4.7E-2	mg/kg-day	--	--	0.0057
	Mercury (total)	310	mg/kg	--	310	mg/kg	M	1.5E-4	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.51
	Thallium	ND	mg/kg	--	ND	mg/kg	M	--	mg/kg-day	8.0E-5	mg/kg-day	--	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	6.8E-5	mg/kg-day	9.0E-3	mg/kg-day	--	--	0.0076
	Organic Compounds													
	Benzene	ND	mg/kg	--	ND	mg/kg	M	--	mg/kg-day	3.0E-3	mg/kg-day	--	--	--
	PAHs													
	Benz[a]anthracene	0.31	mg/kg	--	0.31	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.41	mg/kg	--	0.41	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	0.75	mg/kg	--	0.75	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.071	mg/kg	--	0.071	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.60
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.1E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.0071
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	0.31	mg/kg	0.13	0.31	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.41	mg/kg	0.13	0.41	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	0.75	mg/kg	0.13	0.75	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.071	mg/kg	0.13	0.071	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0071
													Total Hazard Index Across All Exposure Routes/Pathways:	0.61

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (all
Receptor Population: Worker
Receptor Age: Adults

Table C.1.3. Typical
Calculation of Noncancer Hazards
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	5.9E-3	mg/kg-day	1.0E+0	mg/kg-day	--	--	0.0059
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.018
	Chromium	97	mg/kg	--	97	mg/kg	M	4.7E-5	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.016
	Copper	2200	mg/kg	--	2200	mg/kg	M	1.1E-3	mg/kg-day	3.7E-2	mg/kg-day	--	--	0.029
	Iron	22000	mg/kg	--	22000	mg/kg	M	1.1E-2	mg/kg-day	3.0E-1	mg/kg-day	--	--	0.036
	Lead	260	mg/kg	--	260	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	400	mg/kg	--	400	mg/kg	M	2.0E-4	mg/kg-day	4.7E-2	mg/kg-day	--	--	0.0042
	Mercury (total)	2300	mg/kg	--	2300	mg/kg	M	1.1E-3	mg/kg-day	3.0E-4	mg/kg-day	--	--	3.8
	Thallium	1.8	mg/kg	--	1.8	mg/kg	M	8.8E-7	mg/kg-day	8.0E-5	mg/kg-day	--	--	0.011
	Vanadium	140	mg/kg	--	140	mg/kg	M	6.8E-5	mg/kg-day	9.0E-3	mg/kg-day	--	--	0.0076
	Organic Compounds													
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	1.4E-6	mg/kg-day	3.0E-3	mg/kg-day	--	--	0.0005
	PAHs													
	Benz[a]anthracene	0.85	mg/kg	--	0.85	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.68	mg/kg	--	0.68	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.1	mg/kg	--	1.1	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.15	mg/kg	--	0.15	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	3.9
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.1E-6	mg/kg-day	3.0E-4	mg/kg-day	--	--	0.0071
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	0.85	mg/kg	0.13	0.85	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	0.68	mg/kg	0.13	0.68	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.1	mg/kg	0.13	1.1	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.15	mg/kg	0.13	0.15	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0071
													Total Hazard Index Across All Exposure Routes/Pathways:	3.9

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Developed Area subsurface soil (1-20 ft depths
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.4. Typical
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Exposure
Developed Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Arsenic	8.4	mg/kg	--	8.4	mg/kg	M	6.6E-9	mg/kg-day	3.0E-04	mg/kg-day	--	--	0.00002
	Barium	320	mg/kg	--	320	mg/kg	M	2.5E-7	mg/kg-day	7.0E-02	mg/kg-day	--	--	0.000004
	Cadmium	3.4	mg/kg	--	3.4	mg/kg	M	2.7E-9	mg/kg-day	5.0E-04	mg/kg-day	--	--	0.000005
	Chromium	130	mg/kg	--	130	mg/kg	M	1.0E-7	mg/kg-day	3.0E-03	mg/kg-day	--	--	0.00003
	Copper	7400	mg/kg	--	7400	mg/kg	M	5.8E-6	mg/kg-day	3.7E-02	mg/kg-day	--	--	0.0002
	Iron	24000	mg/kg	--	24000	mg/kg	M	1.9E-5	mg/kg-day	3.0E-01	mg/kg-day	--	--	0.00006
	Lead	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	570	mg/kg	--	570	mg/kg	M	4.5E-7	mg/kg-day	4.7E-02	mg/kg-day	--	--	0.00001
	Mercury (total)	2800	mg/kg	--	2800	mg/kg	M	2.2E-6	mg/kg-day	3.0E-04	mg/kg-day	--	--	0.0073
	Nickel	88	mg/kg	--	88	mg/kg	M	6.9E-8	mg/kg-day	2.0E-02	mg/kg-day	--	--	0.000003
	Silver	9.6	mg/kg	--	9.6	mg/kg	M	7.5E-9	mg/kg-day	5.0E-03	mg/kg-day	--	--	0.000002
	Thallium	5.4	mg/kg	--	5.4	mg/kg	M	4.2E-9	mg/kg-day	8.0E-05	mg/kg-day	--	--	0.00005
	Zinc	2100	mg/kg	--	2100	mg/kg	M	1.6E-6	mg/kg-day	3.0E-01	mg/kg-day	--	--	0.000005
	Organic Compounds													
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	2.2E-9	mg/kg-day	3.0E-03	mg/kg-day	--	--	0.0000007
	Toluene	0.011	mg/kg	--	0.011	mg/kg	M	8.6E-12	mg/kg-day	2.0E-01	mg/kg-day	--	--	0.00000000004
	PAHs													
	2-Methylnaphthalene	11	mg/kg	--	11	mg/kg	M	8.6E-9	mg/kg-day	2.0E-02	mg/kg-day	--	--	0.0000004
	Benz[a]anthracene	0.26	mg/kg	--	0.26	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	2.4	mg/kg	--	2.4	mg/kg	M	1.9E-9	mg/kg-day	2.0E-02	mg/kg-day	--	--	0.00000009
	Phenanthrene	5.5	mg/kg	--	5.5	mg/kg	M	4.3E-9	mg/kg-day	3.0E-02	mg/kg-day	--	--	0.0000001
	PCBs	0.36	mg/kg	--	0.36	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0077
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.4	mg/kg	0.03	8.4	mg/kg	M	6.5E-08	mg/kg-day	3.0E-04	mg/kg-day	--	--	0.00022
	Cadmium	3.4	mg/kg	0.001	3.4	mg/kg	M	8.8E-10	mg/kg-day	1.3E-05	mg/kg-day	--	--	0.00007
	Organic Compounds													
	PAHs													
	2-Methylnaphthalene	11	mg/kg	0.13	11	mg/kg	M	3.7E-07	mg/kg-day	0.02	mg/kg-day	--	--	0.00002
	Benz[a]anthracene	0.26	mg/kg	0.13	0.26	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	2.4	mg/kg	0.13	2.4	mg/kg	M	8.1E-08	mg/kg-day	0.02	mg/kg-day	--	--	0.000004
	Phenanthrene	5.5	mg/kg	0.13	5.5	mg/kg	M	1.8E-07	mg/kg-day	0.03	mg/kg-day	--	--	0.000006
	PCBs	0.36	mg/kg	0.14	0.36	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.00032
													Total Hazard Index Across All Exposure Routes/Pathways:	0.0080

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soi
Receptor Population: Worker
Receptor Age: Adults

Table C.1.5. Typical
Calculation of Noncancer Hazards
Worker Surface Soil Exposure: Reasonable Maximum Exposure
Undeveloped Area

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	3.4E-3	mg/kg-day	1.0	mg/kg-day	--	--	0.0034
	Antimony	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	0.0004	mg/kg-day	--	--	0.013
	Arsenic	13	mg/kg	--	13	mg/kg	M	6.4E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.021
	Barium	350	mg/kg	--	350	mg/kg	M	1.7E-4	mg/kg-day	0.070	mg/kg-day	--	--	0.0024
	Cadmium	11	mg/kg	--	11	mg/kg	M	5.4E-6	mg/kg-day	0.0005	mg/kg-day	--	--	0.011
	Chromium	170	mg/kg	--	170	mg/kg	M	8.3E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.028
	Copper	380	mg/kg	--	380	mg/kg	M	1.9E-4	mg/kg-day	0.037	mg/kg-day	--	--	0.0050
	Iron	38000	mg/kg	--	38000	mg/kg	M	1.9E-2	mg/kg-day	0.30	mg/kg-day	--	--	0.062
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	3.0E-4	mg/kg-day	0.05	mg/kg-day	--	--	0.0064
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	2.6E-4	mg/kg-day	0.0003	mg/kg-day	--	--	0.88
	Nickel	63	mg/kg	--	63	mg/kg	M	3.1E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0015
	Silver	15	mg/kg	--	15	mg/kg	M	7.3E-6	mg/kg-day	0.005	mg/kg-day	--	--	0.0015
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	1.4E-6	mg/kg-day	0.0001	mg/kg-day	--	--	0.018
	Vanadium	80	mg/kg	--	80	mg/kg	M	3.9E-5	mg/kg-day	0.009	mg/kg-day	--	--	0.0043
	Zinc	9200	mg/kg	--	9200	mg/kg	M	4.5E-3	mg/kg-day	0.30	mg/kg-day	--	--	0.015
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	4.9E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0024
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	2.0E-6	mg/kg-day	0.03	mg/kg-day	--	--	0.000065
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	1.1
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	2.5E-06	mg/kg-day	0.0003	mg/kg-day	--	--	0.0084
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	7.1E-8	mg/kg-day	0.000013	mg/kg-day	--	--	0.0057
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	6.5E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0032
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	3.4E-6	mg/kg-day	0.03	mg/kg-day	--	--	0.00011
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.017
													Total Hazard Index Across All Exposure Routes/Pathways:	1.1

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sedimen
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.6.Typical
Calculation of Noncancer Hazards
Adult Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Adult Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	1.4E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0001
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	8.6E-8	mg/kg-day	0.0003	mg/kg-day	--	--	0.0003
	Barium	230	mg/kg	--	230	mg/kg	M	2.3E-6	mg/kg-day	0.07	mg/kg-day	--	--	0.00003
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	8.9E-8	mg/kg-day	0.0005	mg/kg-day	--	--	0.0002
	Chromium	160	mg/kg	--	160	mg/kg	M	1.6E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0005
	Copper	190	mg/kg	--	190	mg/kg	M	1.9E-6	mg/kg-day	0.037	mg/kg-day	--	--	0.00005
	Iron	21000	mg/kg	--	21000	mg/kg	M	2.1E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0007
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	1.8E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.00004
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	1.2E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.039
	Nickel	29	mg/kg	--	29	mg/kg	M	2.8E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00001
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	4.2E-8	mg/kg-day	0.005	mg/kg-day	--	--	0.000008
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	4.7E-8	mg/kg-day	0.00008	mg/kg-day	--	--	0.0006
	Vanadium	69	mg/kg	--	69	mg/kg	M	6.8E-7	mg/kg-day	0.009	mg/kg-day	--	--	0.00008
	Zinc	7300	mg/kg	--	7300	mg/kg	M	7.1E-5	mg/kg-day	0.30	mg/kg-day	--	--	0.0002
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	1.8E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.0000006
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.042
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	1.8E-08	mg/kg-day	0.0003	mg/kg-day	--	--	0.00006
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	6.2E-10	mg/kg-day	0.000013	mg/kg-day	--	--	0.00005
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	1.6E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.0000005
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.00011
													Total Hazard Index Across All Exposure Routes/Pathways:	0.042

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sedimen
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.7. Typical
Calculation of Noncancer Hazards
Older Child Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	2.0E-4	mg/kg-day	1.0	mg/kg-day	--	--	0.0002
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	1.2E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0004
	Barium	230	mg/kg	--	230	mg/kg	M	3.2E-6	mg/kg-day	0.07	mg/kg-day	--	--	0.00005
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	1.3E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0003
	Chromium	160	mg/kg	--	160	mg/kg	M	2.2E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0007
	Copper	190	mg/kg	--	190	mg/kg	M	2.7E-6	mg/kg-day	0.037	mg/kg-day	--	--	0.00007
	Iron	21000	mg/kg	--	21000	mg/kg	M	2.9E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0010
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	2.5E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.00005
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	1.7E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.056
	Nickel	29	mg/kg	--	29	mg/kg	M	4.1E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00002
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	6.0E-8	mg/kg-day	0.005	mg/kg-day	--	--	0.00001
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	6.7E-8	mg/kg-day	0.00008	mg/kg-day	--	--	0.0008
	Vanadium	69	mg/kg	--	69	mg/kg	M	9.6E-7	mg/kg-day	0.009	mg/kg-day	--	--	0.0001
	Zinc	7300	mg/kg	--	7300	mg/kg	M	1.0E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0003
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	2.5E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.0000008
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.060
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	5.314E-08	mg/kg-day	0.0003	mg/kg-day	--	--	0.00018
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	1.8E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.00015
	Organic Compounds													
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	4.7E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.0000016
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.00033
													Total Hazard Index Across All Exposure Routes/Pathways:	0.060

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soi
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.8. Typical
Calculation of Noncancer Hazards
Adult Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Adult Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	6.8E-5	mg/kg-day	1.0	mg/kg-day	--	--	0.00007
	Antimony	11	mg/kg	--	11	mg/kg	M	1.1E-7	mg/kg-day	0.0004	mg/kg-day	--	--	0.0003
	Arsenic	13	mg/kg	--	13	mg/kg	M	1.3E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0004
	Barium	350	mg/kg	--	350	mg/kg	M	3.4E-6	mg/kg-day	0.07	mg/kg-day	--	--	0.00005
	Cadmium	11	mg/kg	--	11	mg/kg	M	1.1E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0002
	Chromium	170	mg/kg	--	170	mg/kg	M	1.7E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0006
	Copper	380	mg/kg	--	380	mg/kg	M	3.7E-6	mg/kg-day	0.037	mg/kg-day	--	--	0.0001
	Iron	38000	mg/kg	--	38000	mg/kg	M	3.7E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0012
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	6.0E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.0001
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	5.3E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.018
	Nickel	63	mg/kg	--	63	mg/kg	M	6.2E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00003
	Silver	15	mg/kg	--	15	mg/kg	M	1.5E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.00003
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	2.8E-8	mg/kg-day	0.00008	mg/kg-day	--	--	0.0004
	Vanadium	80	mg/kg	--	80	mg/kg	M	7.8E-7	mg/kg-day	0.009	mg/kg-day	--	--	0.00009
	Zinc	9200	mg/kg	--	9200	mg/kg	M	9.0E-5	mg/kg-day	0.30	mg/kg-day	--	--	0.0003
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	9.8E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00005
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	3.9E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000001
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.022
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	2.7E-08	mg/kg-day	0.0003	mg/kg-day	--	--	0.00009
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	7.5E-10	mg/kg-day	0.000013	mg/kg-day	--	--	0.00006
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	6.8E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00003
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	3.6E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000001
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.00018
													Total Hazard Index Across All Exposure Routes/Pathways:	0.022

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a). Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.9. Typical
Calculation of Noncancer Hazards
Older Child Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	9.8E-5	mg/kg-day	1.0	mg/kg-day	--	--	0.0001
	Antimony	11	mg/kg	--	11	mg/kg	M	1.5E-7	mg/kg-day	0.0004	mg/kg-day	--	--	0.0004
	Arsenic	13	mg/kg	--	13	mg/kg	M	1.8E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0006
	Barium	350	mg/kg	--	350	mg/kg	M	4.9E-6	mg/kg-day	0.07	mg/kg-day	--	--	0.00007
	Cadmium	11	mg/kg	--	11	mg/kg	M	1.5E-7	mg/kg-day	0.0005	mg/kg-day	--	--	0.0003
	Chromium	170	mg/kg	--	170	mg/kg	M	2.4E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0008
	Copper	380	mg/kg	--	380	mg/kg	M	5.3E-6	mg/kg-day	0.04	mg/kg-day	--	--	0.0001
	Iron	38000	mg/kg	--	38000	mg/kg	M	5.3E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0018
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	8.5E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.0002
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	7.5E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.025
	Nickel	63	mg/kg	--	63	mg/kg	M	8.8E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00004
	Silver	15	mg/kg	--	15	mg/kg	M	2.1E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.00004
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	4.1E-8	mg/kg-day	0.00008	mg/kg-day	--	--	0.0005
	Vanadium	80	mg/kg	--	80	mg/kg	M	1.1E-6	mg/kg-day	0.009	mg/kg-day	--	--	0.0001
	Zinc	9200	mg/kg	--	9200	mg/kg	M	1.3E-4	mg/kg-day	0.30	mg/kg-day	--	--	0.0004
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	1.4E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.00007
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	5.6E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000002
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.031
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	7.9E-8	mg/kg-day	0.0003	mg/kg-day	--	--	0.0003
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	2.2E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0002
	Organic Compounds													
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.10	100	mg/kg	M	2.0E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0010
	PAHs													
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	--	--	ND	--	--	--	--
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	1.0E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000003
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	--	--	ND	--	--	--	--
													Hazard Index:	0.0014
													Total Hazard Index Across All Exposure Routes/Pathways:	0.032

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Undeveloped Area subsurface soil (1-20 ft depths
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.10. Typical
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	1.1E-5	mg/kg-day	1.0	mg/kg-day	--	--	0.00001
	Antimony	26	mg/kg	--	26	mg/kg	M	2.0E-8	mg/kg-day	0.0004	mg/kg-day	--	--	0.00005
	Arsenic	23	mg/kg	--	23	mg/kg	M	1.8E-8	mg/kg-day	0.0003	mg/kg-day	--	--	0.00006
	Barium	1500	mg/kg	--	1500	mg/kg	M	1.2E-6	mg/kg-day	0.070	mg/kg-day	--	--	0.00002
	Cadmium	11	mg/kg	--	11	mg/kg	M	8.6E-9	mg/kg-day	0.0005	mg/kg-day	--	--	0.00002
	Chromium	290	mg/kg	--	290	mg/kg	M	2.3E-7	mg/kg-day	0.003	mg/kg-day	--	--	0.00008
	Copper	1400	mg/kg	--	1400	mg/kg	M	1.1E-6	mg/kg-day	0.037	mg/kg-day	--	--	0.00003
	Iron	55000	mg/kg	--	55000	mg/kg	M	4.3E-5	mg/kg-day	0.30	mg/kg-day	--	--	0.0001
	Lead	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--	--	--
	Manganese	1400	mg/kg	--	1400	mg/kg	M	1.1E-6	mg/kg-day	0.047	mg/kg-day	--	--	0.00002
	Mercury (total)	2000	mg/kg	--	2000	mg/kg	M	1.6E-6	mg/kg-day	0.0003	mg/kg-day	--	--	0.0052
	Nickel	93	mg/kg	--	93	mg/kg	M	7.3E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000004
	Silver	75	mg/kg	--	75	mg/kg	M	5.9E-8	mg/kg-day	0.005	mg/kg-day	--	--	0.00001
	Thallium	2.8	mg/kg	--	2.8	mg/kg	M	2.2E-9	mg/kg-day	0.00008	mg/kg-day	--	--	0.00003
	Vanadium	130	mg/kg	--	130	mg/kg	M	1.0E-7	mg/kg-day	0.009	mg/kg-day	--	--	0.00001
	Zinc	5400	mg/kg	--	5400	mg/kg	M	4.2E-6	mg/kg-day	0.30	mg/kg-day	--	--	0.00001
	Organic Compounds													
	Benzene	0.0068	mg/kg	--	0.0068	mg/kg	M	5.3E-12	mg/kg-day	0.003	mg/kg-day	--	--	0.000000002
	Carbazole	0.74	mg/kg	--	0.74	mg/kg	M	--	--	ND	--	--	--	--
	Toluene	0.27	mg/kg	--	0.27	mg/kg	M	2.1E-10	mg/kg-day	0.20	mg/kg-day	--	--	0.000000001
	PAHs													
	2-Methylnaphthalene	0.72	mg/kg	--	0.72	mg/kg	M	5.6E-10	mg/kg-day	0.02	mg/kg-day	--	--	0.00000003
	Benz[a]anthracene	2.2	mg/kg	--	2.2	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.7	mg/kg	--	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.5	mg/kg	--	2.5	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[ghi]perylene	0.89	mg/kg	--	0.89	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	--	0.80	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.32	mg/kg	--	0.32	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	--	0.86	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	1.4	mg/kg	--	1.4	mg/kg	M	1.1E-9	mg/kg-day	0.02	mg/kg-day	--	--	0.00000005
	Phenanthrene	3.6	mg/kg	--	3.6	mg/kg	M	2.8E-9	mg/kg-day	0.03	mg/kg-day	--	--	0.00000009
	PCBs	5.2	mg/kg	--	5.2	mg/kg	M	--	--	ND	--	--	--	--
	Aroclor® 1254	0.55	mg/kg	--	0.55	mg/kg	M	4.3E-10	mg/kg-day	0.00002	mg/kg-day	--	--	0.00002
													Hazard Index:	0.0057
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	23	mg/kg	0.03	23	mg/kg	M	1.8E-7	mg/kg-day	0.0003	mg/kg-day	--	--	0.0006
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	2.8E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0002
	Organic Compounds													
	Carbazole	0.74	mg/kg	0.10	0.74	mg/kg	M	--	--	ND	--	--	--	--
	PAHs													
	2-Methylnaphthalene	0.72	mg/kg	0.13	0.72	mg/kg	M	2.4E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000001
	Benz[a]anthracene	2.2	mg/kg	0.13	2.2	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[a]pyrene	1.7	mg/kg	0.13	1.7	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[b]fluoranthene	2.5	mg/kg	0.13	2.5	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[ghi]perylene	0.89	mg/kg	0.13	0.89	mg/kg	M	--	--	ND	--	--	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	0.13	0.80	mg/kg	M	--	--	ND	--	--	--	--
	Dibenz[a,h]anthracene	0.32	mg/kg	0.13	0.32	mg/kg	M	--	--	ND	--	--	--	--
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	0.13	0.86	mg/kg	M	--	--	ND	--	--	--	--
	Naphthalene	1.4	mg/kg	0.13	1.4	mg/kg	M	4.7E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000002
	Phenanthrene	3.6	mg/kg	0.13	3.6	mg/kg	M	1.2E-7	mg/kg-day	0.03	mg/kg-day	--	--	0.000004
	PCBs	5.2	mg/kg	0.14	5.2	mg/kg	M	--	--	ND	--	--	--	--
	Aroclor® 1254	0.55	mg/kg	0.14	0.55	mg/kg	M	2.0E-8	mg/kg-day	0.00002	mg/kg-day	--	--	0.0010
													Hazard Index:	0.0018
													Total Hazard Index Across All Exposure Routes/Pathways:	0.0076

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.11. Typical
Calculation of Noncancer Hazards
Adult Surface Water Exposure: Reasonable Maximum Recreational Scenario
Operable Unit 1

Adult Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	--	2.6	mg/L	M	3.1E-6	mg/kg-day	0.30	mg/kg-day	--	--	0.00001
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	4.8E-7	mg/kg-day	0.047	mg/kg-day	--	--	0.00001
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	2.1E-8	mg/kg-day	0.0003	mg/kg-day	--	--	0.00007
													Hazard Index:	0.000091
Dermal	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	1.3E-6	--	0.003	mg/kg-day	--	--	0.0004
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	2.0E-7	mg/kg-day	0.0019	mg/kg-day	--	--	0.00011
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	8.8E-9	mg/kg-day	0.000021	mg/kg-day	--	--	0.0004
													Hazard Index:	0.00095
													Total Hazard Index Across All Exposure Routes/Pathways:	0.00104

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Older child

Table C.1.12. Typical
Calculation of Noncancer Hazards
Child Surface Water Exposure: Reasonable Maximum Recreational Scenario
Operable Unit 1

Older Child Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	--	2.6	mg/L	M	4.4E-6	mg/kg-day	0.30	mg/kg-day	--	--	0.00001
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	6.9E-7	mg/kg-day	0.047	mg/kg-day	--	--	0.00001
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	3.0E-8	mg/kg-day	0.0003	mg/kg-day	--	--	0.0001
													Hazard Index:	0.00013
Dermal	**Metals and Organometallic Compounds**													
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	1.3E-6	--	0.003	mg/kg-day	--	--	0.0004
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	2.1E-7	mg/kg-day	0.0019	mg/kg-day	--	--	0.00011
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	9.1E-9	mg/kg-day	0.000021	mg/kg-day	--	--	0.0004
													Hazard Index:	0.00098
													Total Hazard Index Across All Exposure Routes/Pathways:	0.00111

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencantration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater
Exposure Point: Groundwater sitewide
Receptor Population: Worker
Receptor Age: Adult

Table C.1.13. Typical
Calculation of Noncancer Hazards
Adult Groundwater Exposure: Reasonable Maxium Scenario
Groundwater

Adult Groundwater Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Permeability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Non-cancer)	Intake (Non-cancer) Units	Reference Dose[c]	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	**Metals and Organometallic Compounds**													
	Arsenic	0.0052	mg/L	--	0.0052	mg/L	M	1.3E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.044
	Barium	0.52	mg/L	--	0.52	mg/L	M	1.3E-3	mg/kg-day	0.07	mg/kg-day	--	--	0.019
	Cadmium	0.0038	mg/L	--	0.0038	mg/L	M	9.5E-6	mg/kg-day	0.0005	mg/kg-day	--	--	0.019
	Copper	0.018	mg/L	--	0.018	mg/L	M	4.5E-5	mg/kg-day	0.037	mg/kg-day	--	--	0.0012
	Iron	16	mg/L	--	16	mg/L	M	4.0E-2	mg/kg-day	0.30	mg/kg-day	--	--	0.13
	Manganese	4.8	mg/L	--	4.8	mg/L	M	1.2E-2	mg/kg-day	0.047	mg/kg-day	--	--	0.26
	Mercury (total)	0.028	mg/L	--	0.028	mg/L	M	7.0E-5	mg/kg-day	0.0003	mg/kg-day	--	--	0.23
	Nickel	0.020	mg/L	--	0.02	mg/L	M	5.0E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0025
	Thallium	0.0039	mg/L	--	0.0039	mg/L	M	9.8E-6	mg/kg-day	0.00008	mg/kg-day	--	--	0.12
	Vanadium	0.025	mg/L	--	0.025	mg/L	M	6.3E-5	mg/kg-day	0.009	mg/kg-day	--	--	0.0070
	Organic Compounds													
	Acetone	0.10	mg/L	--	0.10	mg/L	M	2.5E-4	mg/kg-day	0.10	mg/kg-day	--	--	0.0025
	Benzene	0.019	mg/L	--	0.019	mg/L	M	4.8E-5	mg/kg-day	0.003	mg/kg-day	--	--	0.016
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	--	0.006	mg/L	M	1.5E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0008
	Chlorobenzene	0.0064	mg/L	--	0.0064	mg/L	M	1.6E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0008
	Chloroethane	0.0078	mg/L	--	0.0078	mg/L	M	2.0E-5	mg/kg-day	0.4	mg/kg-day	--	--	0.00005
	1,2-Dichloroethene, Isomers	0.012	mg/L	--	0.012	mg/L	M	3.0E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0015
	1,4-Dichlorobenzene	0.004	mg/L	--	0.004	mg/L	M	1.0E-5	mg/kg-day	0.03	mg/kg-day	--	--	0.0003
	4-Methyl-2-pentanone	0.0095	mg/L	--	0.0095	mg/L	M	2.4E-5	mg/kg-day	0.08	mg/kg-day	--	--	0.0003
	4-Methylphenol	0.013	mg/L	--	0.013	mg/L	M	3.3E-5	mg/kg-day	0.005	mg/kg-day	--	--	0.0065
	Toluene	0.039	mg/L	--	0.039	mg/L	M	9.8E-5	mg/kg-day	0.2	mg/kg-day	--	--	0.0005
	Xylene	0.058	mg/L	--	0.058	mg/L	M	1.5E-4	mg/kg-day	2.0	mg/kg-day	--	--	0.00007
	PAHs													
	2-Methylnaphthalene	0.001	mg/L	--	0.001	mg/L	M	2.5E-6	mg/kg-day	0.02	mg/kg-day	--	--	0.0001
	Naphthalene	0.017	mg/L	--	0.017	mg/L	M	4.3E-5	mg/kg-day	0.02	mg/kg-day	--	--	0.0021
													Hazard Index:	0.87
Dermal	**Metals and Organometallic Compounds**													
	Arsenic	0.0052	mg/L	0.001	0.0052	mg/L	M	2.4E-9	mg/kg-day	0.0003	mg/kg-day	--	--	0.000008
	Barium	0.52	mg/L	0.001	0.52	mg/L	M	2.4E-7	mg/kg-day	0.0049	mg/kg-day	--	--	0.00005
	Cadmium	0.0038	mg/L	0.001	0.0038	mg/L	M	1.8E-9	mg/kg-day	0.000013	mg/kg-day	--	--	0.0001
	Copper	0.018	mg/L	0.001	0.018	mg/L	M	8.4E-9	mg/kg-day	0.00037	mg/kg-day	--	--	0.00002
	Iron	16	mg/L	0.001	16	mg/L	M	7.4E-6	mg/kg-day	0.003	mg/kg-day	--	--	0.0025
	Manganese	4.8	mg/L	0.001	4.8	mg/L	M	2.2E-6	mg/kg-day	0.0019	mg/kg-day	--	--	0.0012
	Mercury (total)	0.028	mg/L	0.001	0.028	mg/L	M	1.3E-8	mg/kg-day	0.000021	mg/kg-day	--	--	0.0006
	Nickel	0.020	mg/L	0.0002	0.020	mg/L	M	1.9E-9	mg/kg-day	0.0008	mg/kg-day	--	--	0.000002
	Thallium	0.0039	mg/L	0.001	0.0039	mg/L	M	1.8E-9	mg/kg-day	0.00008	mg/kg-day	--	--	0.00002
	Vanadium	0.025	mg/L	0.001	0.025	mg/L	M	1.2E-8	mg/kg-day	0.00023	mg/kg-day	--	--	0.00005
	Organic Compounds													
	Acetone	0.10	mg/L	0.0014	0.10	mg/L	M	6.5E-8	mg/kg-day	0.1	mg/kg-day	--	--	0.0000007
	Benzene	0.019	mg/L	0.015	0.019	mg/L	M	1.3E-7	mg/kg-day	0.003	mg/kg-day	--	--	0.00004
	Bis[2-ethylhexyl]phthalate	0.006	mg/L	0.025	0.006	mg/L	M	7.0E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000003
	Chlorobenzene	0.0064	mg/L	0.029	0.0064	mg/L	M	8.6E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000004
	Chloroethane	0.0078	mg/L	0.0047	0.0078	mg/L	M	1.7E-8	mg/kg-day	0.4	mg/kg-day	--	--	0.00000004
	1,2-Dichloroethene, Isomers	0.012	mg/L	0.0079	0.012	mg/L	M	4.4E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000002
	1,4-Dichlorobenzene	0.004	mg/L	0.043	0.004	mg/L	M	8.0E-8	mg/kg-day	0.03	mg/kg-day	--	--	0.000003
	4-Methyl-2-pentanone	0.0095	mg/L	0.000036	0.0095	mg/L	M	1.6E-10	mg/kg-day	0.08	mg/kg-day	--	--	0.000000002
	4-Methylphenol	0.013	mg/L	0.040	0.013	mg/L	M	2.4E-7	mg/kg-day	0.005	mg/kg-day	--	--	0.00005
	Toluene	0.039	mg/L	0.012	0.039	mg/L	M	2.2E-7	mg/kg-day	0.2	mg/kg-day	--	--	0.000001
	Xylene	0.058	mg/L	0.054	0.058	mg/L	M	1.5E-6	mg/kg-day	2.0	mg/kg-day	--	--	0.0000007
	PAHs													
	2-Methylnaphthalene	0.001	mg/L	0.048	0.001	mg/L	M	2.2E-8	mg/kg-day	0.02	mg/kg-day	--	--	0.000001
	Naphthalene	0.017	mg/L	0.048	0.017	mg/L	M	3.8E-7	mg/kg-day	0.02	mg/kg-day	--	--	0.00002
													Hazard Index:	0.0047
													Total Hazard Index Across All Exposure Routes/Pathways:	0.88

Note:
-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Dermal permiability constants from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Information System (IRIS) (June 2001a).
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EPA 1999a).

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Outdoor Air
Receptor Population: Worker
Receptor Age: Adults

Table C.1.14. Typical
Calculation of Cancer Risks
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Inhalation

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Inhalation	**Metals and Organometallic Compounds**											
	Mercury (total)	3.3E-05	mg/kg	--	3.3E-05	mg/kg	M	--	--	ND	--	--
											Total Risk:	0E+0

Note:
-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration
[b]Absorption factors from U.S. EPA (1999a).
[c]Represents cancer slope factor for mercury vapor

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (unpaved
Receptor Population: Worker
Receptor Age: Adults

Table C.1.15. Typical
Calculation of Cancer Risks
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	--	--	ND	--	--
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.1E-7	mg/kg-day	1.5	(mg/kg-day)-1	8E-7
	Chromium	97	mg/kg	--	97	mg/kg	M	--	--	ND	--	--
	Copper	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Iron	23000	mg/kg	--	23000	mg/kg	M	--	--	ND	--	--
	Lead	390	mg/kg	--	390	mg/kg	M	--	--	ND	--	--
	Manganese	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Mercury (total)	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--
	Thallium	ND	mg/kg	--	ND	mg/kg	M	--	--	ND	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	ND	mg/kg	--	ND	mg/kg	M	--	--	0.055	(mg/kg-day)-1	--
	PAHs											
	Benz[a]anthracene	0.31	mg/kg	--	0.31	mg/kg	M	1.4E-8	mg/kg-day	0.73	(mg/kg-day)-1	1E-8
	Benzo[a]pyrene	0.41	mg/kg	--	0.41	mg/kg	M	1.9E-8	mg/kg-day	7.3	(mg/kg-day)-1	1E-7
	Benzo[b]fluoranthene	0.75	mg/kg	--	0.75	mg/kg	M	3.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	3E-8
	Dibenz[a,h]anthracene	0.071	mg/kg	--	0.071	mg/kg	M	3.3E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
											Total Risk:	1E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.0E-7	mg/kg-day	1.5	(mg/kg-day)-1	3E-7
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	0.31	mg/kg	0.13	0.31	mg/kg	M	2.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	2E-8
	Benzo[a]pyrene	0.41	mg/kg	0.13	0.41	mg/kg	M	3.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Benzo[b]fluoranthene	0.75	mg/kg	0.13	0.75	mg/kg	M	5.9E-8	mg/kg-day	0.73	(mg/kg-day)-1	4E-8
	Dibenz[a,h]anthracene	0.071	mg/kg	0.13	0.071	mg/kg	M	5.6E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
											Total Risk:	6E-7
											Total Risk Across all Exposure Pathways:	2E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a)
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) *or* EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. El

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Developed Area surface soil (all
Receptor Population: Worker
Receptor Age: Adults

Table C.1.16. Typical
Calculation of Cancer Risks
Worker: Reasonable Exposure Scenario
Developed Area Surface Soils

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	12000	mg/kg	--	12000	mg/kg	M	--	--	ND	--	--
	Arsenic	11	mg/kg	--	11	mg/kg	M	5.1E-7	mg/kg-day	1.5	(mg/kg-day)-1	8E-7
	Chromium	97	mg/kg	--	97	mg/kg	M	--	--	ND	--	--
	Copper	2200	mg/kg	--	2200	mg/kg	M	--	--	ND	--	--
	Iron	22000	mg/kg	--	22000	mg/kg	M	--	--	ND	--	--
	Lead	260	mg/kg	--	260	mg/kg	M	--	--	ND	--	--
	Manganese	400	mg/kg	--	400	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2300	mg/kg	--	2300	mg/kg	M	--	--	ND	--	--
	Thallium	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	Vanadium	140	mg/kg	--	140	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	1.3E-7	mg/kg-day	0.055	(mg/kg-day)-1	7E-9
	PAHs											
	Benz[a]anthracene	0.85	mg/kg	--	0.85	mg/kg	M	3.9E-8	mg/kg-day	0.73	(mg/kg-day)-1	3E-8
	Benzo[a]pyrene	0.68	mg/kg	--	0.68	mg/kg	M	3.1E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Benzo[b]fluoranthene	1.1	mg/kg	--	1.1	mg/kg	M	5.1E-8	mg/kg-day	0.73	(mg/kg-day)-1	4E-8
	Dibenz[a,h]anthracene	0.15	mg/kg	--	0.15	mg/kg	M	6.9E-9	mg/kg-day	7.3	(mg/kg-day)-1	5E-8
											Total Risk:	1E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	11	mg/kg	0.03	11	mg/kg	M	2.0E-7	mg/kg-day	1.5	(mg/kg-day)-1	3E-7
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	0.85	mg/kg	0.13	0.85	mg/kg	M	6.7E-8	mg/kg-day	0.73	(mg/kg-day)-1	5E-8
	Benzo[a]pyrene	0.68	mg/kg	0.13	0.68	mg/kg	M	5.4E-8	mg/kg-day	7.3	(mg/kg-day)-1	4E-7
	Benzo[b]fluoranthene	1.1	mg/kg	0.13	1.1	mg/kg	M	8.7E-8	mg/kg-day	0.73	(mg/kg-day)-1	6E-8
	Dibenz[a,h]anthracene	0.15	mg/kg	0.13	0.15	mg/kg	M	1.2E-8	mg/kg-day	7.3	(mg/kg-day)-1	9E-8
											Total Risk:	9E-7
											Total Risk Across all Exposure Pathways:	2E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Developed Area subsurface soil (1-20 ft depths
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.17. Typical
Calculation of Cancer Risks
Adult Subsurface Soil Exposure: Reasonable Maximum Exposure
Developed Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Arsenic	8.4	mg/kg	--	8.4	mg/kg	M	4.7E-9	mg/kg-day	1.5	(mg/kg-day)-1	7E-9
	Barium	320	mg/kg	--	320	mg/kg	M	--	--	ND	--	--
	Cadmium	3.4	mg/kg	--	3.4	mg/kg	M	--	--	ND	--	--
	Chromium	130	mg/kg	--	130	mg/kg	M	--	--	ND	--	--
	Copper	7400	mg/kg	--	7400	mg/kg	M	--	--	ND	--	--
	Iron	24000	mg/kg	--	24000	mg/kg	M	--	--	ND	--	--
	Lead	310	mg/kg	--	310	mg/kg	M	--	--	ND	--	--
	Manganese	570	mg/kg	--	570	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2800	mg/kg	--	2800	mg/kg	M	--	--	ND	--	--
	Nickel	88	mg/kg	--	88	mg/kg	M	--	--	ND	--	--
	Silver	9.6	mg/kg	--	9.6	mg/kg	M	--	--	ND	--	--
	Thallium	5.4	mg/kg	--	5.4	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	2.8	mg/kg	--	2.8	mg/kg	M	1.6E-9	mg/kg-day	0.055	(mg/kg-day)-1	9E-11
	Toluene	0.011	mg/kg	--	0.011	mg/kg	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	0.26	mg/kg	--	0.26	mg/kg	M	1.5E-10	mg/kg-day	0.73	(mg/kg-day)-1	1E-10
	Naphthalene	2.4	mg/kg	--	2.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	5.5	mg/kg	--	5.5	mg/kg	M	--	--	ND	--	--
	PCBs	0.36	mg/kg	--	0.36	mg/kg	M	2.0E-10	mg/kg-day	2.0	(mg/kg-day)-1	4E-10
											Total Risk:	8E-9
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.4	mg/kg	0.03	8.4	mg/kg	M	1.86E-09	mg/kg-day	1.5	(mg/kg-day)-1	2.8E-09
	Cadmium	3.4	mg/kg	0.001	3.4	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	2-Methylnaphthalene	11	mg/kg	0.13	11	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	0.26	mg/kg	0.13	0.26	mg/kg	M	2.495E-10	mg/kg-day	0.73	(mg/kg-day)-1	2E-10
	Naphthalene	2.4	mg/kg	0.13	2.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	5.5	mg/kg	0.13	5.5	mg/kg	M	--	--	ND	--	--
	PCBs	0.36	mg/kg	0.14	0.36	mg/kg	M	3.72E-10	mg/kg-day	2.0	(mg/kg-day)-1	7E-10
											Total Risk:	4E-9
											Total Risk Across all Exposure Pathways:	1E-8

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soi
Receptor Population: Worker
Receptor Age: Adults

Table C.1.18. Typical
Calculation of Cancer Risks
Worker Surface Soil Exposure: Reasonable Maximum Exposure
Undeveloped Area

Worker Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	6.0E-7	mg/kg-day	1.5	(mg/kg-day)-1	9E-7
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	4.6E-6	mg/kg-day	0.014	(mg/kg-day)-1	6E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	7.8E-8	mg/kg-day	0.73	(mg/kg-day)-1	6E-8
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	9.7E-8	mg/kg-day	7.3	(mg/kg-day)-1	7E-7
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	1.1E-7	mg/kg-day	0.73	(mg/kg-day)-1	8E-8
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	2.3E-8	mg/kg-day	7.3	(mg/kg-day)-1	2E-7
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	5.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	4E-8
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	2.0E-7	mg/kg-day	2.0	(mg/kg-day)-1	4E-7
											Total Risk:	2E-6
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	2.375E-07	mg/kg-day	1.5	(mg/kg-day)-1	4E-7
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	0.1	100	mg/kg	M	6.089E-06	mg/kg-day	0.014	(mg/kg-day)-1	9E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	1.3E-7	mg/kg-day	0.73	(mg/kg-day)-1	1E-7
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	1.7E-7	mg/kg-day	7.3	(mg/kg-day)-1	1E-6
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	1.9E-7	mg/kg-day	0.73	(mg/kg-day)-1	1E-7
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	4.0E-8	mg/kg-day	7.3	(mg/kg-day)-1	3E-7
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	9.5E-8	mg/kg-day	0.73	(mg/kg-day)-1	7E-8
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	3.8E-7	mg/kg-day	2.0	(mg/kg-day)-1	8E-7
											Total Risk:	3E-6
											Total Risk Across all Exposure Pathways:	5E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sedimen
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.19. Typical
Calculation of Cancer Risks
Adult Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Adult Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	1.1E-8	mg/kg-day	1.5	(mg/kg-day)-1	2E-8
	Barium	230	mg/kg	--	230	mg/kg	M	--	--	ND	--	--
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	--	--	ND	--	--
	Chromium	160	mg/kg	--	160	mg/kg	M	--	--	ND	--	--
	Copper	190	mg/kg	--	190	mg/kg	M	--	--	ND	--	--
	Iron	21000	mg/kg	--	21000	mg/kg	M	--	--	ND	--	--
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	--	--	ND	--	--
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	--	--	ND	--	--
	Nickel	29	mg/kg	--	29	mg/kg	M	--	--	ND	--	--
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	--	--	ND	--	--
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	--	--	ND	--	--
	Vanadium	69	mg/kg	--	69	mg/kg	M	--	--	ND	--	--
	Zinc	7300	mg/kg	--	7300	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	2.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	2.0E-9	mg/kg-day	7.3	(mg/kg-day)-1	1E-8
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	2.3E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	6.2E-10	mg/kg-day	7.3	(mg/kg-day)-1	5E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	1.5E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.7	mg/kg	--	0.7	mg/kg	M	9.2E-10	mg/kg-day	2.0	(mg/kg-day)-1	2E-9
											Total Risk:	4E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	2.325E-09	mg/kg-day	1.5	(mg/kg-day)-1	3E-9
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	1.9E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	1.8E-9	mg/kg-day	7.3	(mg/kg-day)-1	1E-8
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	2.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	5.6E-10	mg/kg-day	7.3	(mg/kg-day)-1	4E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.4E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	9.0E-10	mg/kg-day	2.0	(mg/kg-day)-1	2E-9
											Total Risk:	3E-8
											Total Risk Across all Exposure Pathways:	7E-8

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Undeveloped Area surface sedimen
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.20. Typical
Calculation of Cancer Risks
Older Child Sediment Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Sediment Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Arsenic	8.8	mg/kg	--	8.8	mg/kg	M	1.6E-8	mg/kg-day	1.5	(mg/kg-day)-1	2E-8
	Barium	230	mg/kg	--	230	mg/kg	M	--	--	ND	--	--
	Cadmium	9.1	mg/kg	--	9.1	mg/kg	M	--	--	ND	--	--
	Chromium	160	mg/kg	--	160	mg/kg	M	--	--	ND	--	--
	Copper	190	mg/kg	--	190	mg/kg	M	--	--	ND	--	--
	Iron	21000	mg/kg	--	21000	mg/kg	M	--	--	ND	--	--
	Lead	470	mg/kg	--	470	mg/kg	M	--	--	ND	--	--
	Manganese	180	mg/kg	--	180	mg/kg	M	--	--	ND	--	--
	Mercury (total)	1200	mg/kg	--	1200	mg/kg	M	--	--	ND	--	--
	Nickel	29	mg/kg	--	29	mg/kg	M	--	--	ND	--	--
	Silver	4.3	mg/kg	--	4.3	mg/kg	M	--	--	ND	--	--
	Thallium	4.8	mg/kg	--	4.8	mg/kg	M	--	--	ND	--	--
	Vanadium	69	mg/kg	--	69	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	3.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	1.6	mg/kg	--	1.6	mg/kg	M	2.9E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
	Benzo[b]fluoranthene	1.8	mg/kg	--	1.8	mg/kg	M	3.2E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Dibenz[a,h]anthracene	0.49	mg/kg	--	0.49	mg/kg	M	8.8E-10	mg/kg-day	7.3	(mg/kg-day)-1	6E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	2.2E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Phenanthrene	1.8	mg/kg	--	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	--	0.73	mg/kg	M	1.3E-9	mg/kg-day	2.0	(mg/kg-day)-1	3E-9
											Total Risk:	6E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	8.8	mg/kg	0.03	8.8	mg/kg	M	6.832E-09	mg/kg-day	1.5	(mg/kg-day)-1	1E-08
	Cadmium	9.1	mg/kg	0.001	9.1	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	5.7E-9	mg/kg-day	0.73	(mg/kg-day)-1	4E-09
	Benzo[a]pyrene	1.6	mg/kg	0.13	1.6	mg/kg	M	5.4E-9	mg/kg-day	7.3	(mg/kg-day)-1	4E-8
	Benzo[b]fluoranthene	1.8	mg/kg	0.13	1.8	mg/kg	M	6.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	4E-9
	Dibenz[a,h]anthracene	0.49	mg/kg	0.13	0.49	mg/kg	M	1.6E-9	mg/kg-day	7.3	(mg/kg-day)-1	1E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	4.0E-9	mg/kg-day	0.73	(mg/kg-day)-1	3E-9
	Phenanthrene	1.8	mg/kg	0.13	1.8	mg/kg	M	--	--	ND	--	--
	PCBs	0.73	mg/kg	0.14	0.73	mg/kg	M	2.6E-9	mg/kg-day	2.0	(mg/kg-day)-1	5E-9
											Total Risk:	8E-8
											Total Risk Across all Exposure Pathways:	1E-7

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a] Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b] Absorption factors from U.S. EPA (1999a).
[c] Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. El

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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soil
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.21. Typical
Calculation of Cancer Risks
Adult Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Adult Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	1.6E-8	mg/kg-day	1.5	(mg/kg-day)-1	2E-8
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis(2-ethylhexyl)phthalate	100	mg/kg	--	100	mg/kg	M	1.3E-7	mg/kg-day	0.014	(mg/kg-day)-1	2E-9
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	2.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	2.6E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	3.0E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	6.3E-10	mg/kg-day	7.3	(mg/kg-day)-1	5E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	1.5E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	5.5E-9	mg/kg-day	2.0	(mg/kg-day)-1	1E-8
											Total Risk:	7E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	3.434E-09	mg/kg-day	1.5	(mg/kg-day)-1	5E-9
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis(2-ethylhexyl)phthalate	100	mg/kg	0.10	100	mg/kg	M	8.8E-8	mg/kg-day	0.014	(mg/kg-day)-1	1E-9
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	1.9E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	2.4E-9	mg/kg-day	7.3	(mg/kg-day)-1	2E-8
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	2.7E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	5.7E-10	mg/kg-day	7.3	(mg/kg-day)-1	4E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	1.4E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	5.4E-9	mg/kg-day	2.0	(mg/kg-day)-1	1E-8
											Total Risk:	4E-8
											Total Risk Across all Exposure Pathways:	1E-7

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface soil
Exposure Point: Undeveloped Area surface soi
Receptor Population: Trespasser
Receptor Age: Older Child

Table C.1.22. Typical
Calculation of Cancer Risks
Older Child Surface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Older Child Trespasser Surface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	7000	mg/kg	--	7000	mg/kg	M	--	--	ND	--	--
	Antimony	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Arsenic	13	mg/kg	--	13	mg/kg	M	2.3E-8	mg/kg-day	1.5	(mg/kg-day)-1	4E-8
	Barium	350	mg/kg	--	350	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	170	mg/kg	--	170	mg/kg	M	--	--	ND	--	--
	Copper	380	mg/kg	--	380	mg/kg	M	--	--	ND	--	--
	Iron	38000	mg/kg	--	38000	mg/kg	M	--	--	ND	--	--
	Lead	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Manganese	610	mg/kg	--	610	mg/kg	M	--	--	ND	--	--
	Mercury (total)	540	mg/kg	--	540	mg/kg	M	--	--	ND	--	--
	Nickel	63	mg/kg	--	63	mg/kg	M	--	--	ND	--	--
	Silver	15	mg/kg	--	15	mg/kg	M	--	--	ND	--	--
	Thallium	2.9	mg/kg	--	2.9	mg/kg	M	--	--	ND	--	--
	Vanadium	80	mg/kg	--	80	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	1.8E-7	mg/kg-day	0.014	(mg/kg-day)-1	3E-9
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	--	1.7	mg/kg	M	3.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	2.1	mg/kg	--	2.1	mg/kg	M	3.8E-9	mg/kg-day	7.3	(mg/kg-day)-1	3E-8
	Benzo[b]fluoranthene	2.4	mg/kg	--	2.4	mg/kg	M	4.3E-9	mg/kg-day	0.73	(mg/kg-day)-1	3E-9
	Dibenz[a,h]anthracene	0.50	mg/kg	--	0.50	mg/kg	M	9.0E-10	mg/kg-day	7.3	(mg/kg-day)-1	7E-9
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	--	1.2	mg/kg	M	2.2E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Phenanthrene	4.0	mg/kg	--	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	--	4.4	mg/kg	M	7.9E-9	mg/kg-day	2.0	(mg/kg-day)-1	2E-8
											Total Risk:	9E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	13	mg/kg	0.03	13	mg/kg	M	1.009E-08	mg/kg-day	1.5	(mg/kg-day)-1	2E-08
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Bis[2-ethylhexyl]phthalate	100	mg/kg	--	100	mg/kg	M	2.6E-6	mg/kg-day	0.014	(mg/kg-day)-1	4E-8
	PAHs											
	Benz[a]anthracene	1.7	mg/kg	0.13	1.7	mg/kg	M	5.7E-9	mg/kg-day	0.73	(mg/kg-day)-1	
	Benzo[a]pyrene	2.1	mg/kg	0.13	2.1	mg/kg	M	7.1E-9	mg/kg-day	7.3	(mg/kg-day)-1	5E-8
	Benzo[b]fluoranthene	2.4	mg/kg	0.13	2.4	mg/kg	M	8.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	6E-9
	Dibenz[a,h]anthracene	0.50	mg/kg	0.13	0.50	mg/kg	M	1.7E-9	mg/kg-day	7.3	(mg/kg-day)-1	1E-8
	Indeno[1,2,3-cd]pyrene	1.2	mg/kg	0.13	1.2	mg/kg	M	4.0E-9	mg/kg-day	0.73	(mg/kg-day)-1	3E-9
	Phenanthrene	4.0	mg/kg	0.13	4.0	mg/kg	M	--	--	ND	--	--
	PCBs	4.4	mg/kg	0.14	4.4	mg/kg	M	1.6E-8	mg/kg-day	2.0	(mg/kg-day)-1	3E-8
											Total Risk:	2E-7
											Total Risk Across all Exposure Pathways:	3E-7

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. E

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface soil
Exposure Point: Undeveloped Area subsurface soil (1-20 ft depth
Receptor Population: Construction Worker
Receptor Age: Adults

Table C.1.23. Typical
Calculation of Noncancer Hazards
Adult Subsurface Soil Exposure: Reasonable Maximum Recreational
Undeveloped Area

Construction Worker Subsurface Soil Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal Absorption Factor[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Aluminum	14000	mg/kg	--	14000	mg/kg	M	--	--	ND	--	--
	Antimony	26	mg/kg	--	26	mg/kg	M	--	--	ND	--	--
	Arsenic	23	mg/kg	--	23	mg/kg	M	1.3E-8	mg/kg-day	1.5	(mg/kg-day)-1	2E-8
	Barium	1500	mg/kg	--	1500	mg/kg	M	--	--	ND	--	--
	Cadmium	11	mg/kg	--	11	mg/kg	M	--	--	ND	--	--
	Chromium	290	mg/kg	--	290	mg/kg	M	--	--	ND	--	--
	Copper	1400	mg/kg	--	1400	mg/kg	M	--	--	ND	--	--
	Iron	55000	mg/kg	--	55000	mg/kg	M	--	--	ND	--	--
	Lead	9200	mg/kg	--	9200	mg/kg	M	--	--	ND	--	--
	Manganese	1400	mg/kg	--	1400	mg/kg	M	--	--	ND	--	--
	Mercury (total)	2000	mg/kg	--	2000	mg/kg	M	--	--	ND	--	--
	Nickel	93	mg/kg	--	93	mg/kg	M	--	--	ND	--	--
	Silver	75	mg/kg	--	75	mg/kg	M	--	--	ND	--	--
	Thallium	2.8	mg/kg	--	2.8	mg/kg	M	--	--	ND	--	--
	Vanadium	130	mg/kg	--	130	mg/kg	M	--	--	ND	--	--
	Zinc	14	mg/kg	--	14	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Benzene	0.0068	mg/kg	--	0.0068	mg/kg	M	3.8E-12	mg/kg-day	0.06	(mg/kg-day)-1	2E-13
	Carbazole	0.74	mg/kg	--	0.74	mg/kg	M	4.1E-10	mg/kg-day	0.02	(mg/kg-day)-1	8E-12
	Toluene	0.27	mg/kg	--	0.27	mg/kg	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.72	mg/kg	--	0.72	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	2.2	mg/kg	--	2.2	mg/kg	M	1.2E-9	mg/kg-day	0.73	(mg/kg-day)-1	9E-10
	Benzo[a]pyrene	1.7	mg/kg	--	1.7	mg/kg	M	9.5E-10	mg/kg-day	7.3	(mg/kg-day)-1	7E-9
	Benzo[b]fluoranthene	2.5	mg/kg	--	2.5	mg/kg	M	1.4E-9	mg/kg-day	0.73	(mg/kg-day)-1	1E-9
	Benzo[ghi]perylene	0.89	mg/kg	--	0.89	mg/kg	M	--	--	ND	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	--	0.80	mg/kg	M	4.5E-10	mg/kg-day	0.073	(mg/kg-day)-1	3E-11
	Dibenz[a,h]anthracene	0.32	mg/kg	--	0.32	mg/kg	M	1.8E-10	mg/kg-day	7.3	(mg/kg-day)-1	1E-9
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	--	0.86	mg/kg	M	4.8E-10	mg/kg-day	0.73	(mg/kg-day)-1	4E-10
	Naphthalene	1.4	mg/kg	--	1.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	3.6	mg/kg	--	3.6	mg/kg	M	--	--	ND	--	--
	PCBs	5.2	mg/kg	--	5.2	mg/kg	M	2.9E-9	mg/kg-day	2.0	(mg/kg-day)-1	6E-9
	Aroclor® 1260	0.55	mg/kg	--	0.55	mg/kg	M	--	--	ND	--	--
											Total Risk:	4E-8
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	23	mg/kg	0.03	23	mg/kg	M	5.1E-9	mg/kg-day	1.5	(mg/kg-day)-1	8E-09
	Cadmium	11	mg/kg	0.001	11	mg/kg	M	--	--	ND	--	--
	Organic Compounds											
	Carbazole	0.74	mg/kg	0.10	0.74	mg/kg	M	5.5E-10	mg/kg-day	0.02	(mg/kg-day)-1	1E-11
	PAHs											
	2-Methylnaphthalene	0.72	mg/kg	0.13	0.72	mg/kg	M	--	--	ND	--	--
	Benz[a]anthracene	2.2	mg/kg	0.13	2.2	mg/kg	M	2.1E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[a]pyrene	1.7	mg/kg	0.13	1.7	mg/kg	M	1.6E-9	mg/kg-day	7.3	(mg/kg-day)-1	1E-8
	Benzo[b]fluoranthene	2.5	mg/kg	0.13	2.5	mg/kg	M	2.4E-9	mg/kg-day	0.73	(mg/kg-day)-1	2E-9
	Benzo[ghi]perylene	0.89	mg/kg	0.13	0.89	mg/kg	M	--	--	ND	--	--
	Benzo[k]fluoranthene	0.80	mg/kg	0.13	0.80	mg/kg	M	7.7E-10	mg/kg-day	0.073	(mg/kg-day)-1	6E-11
	Dibenz[a,h]anthracene	0.32	mg/kg	0.13	0.32	mg/kg	M	3.1E-10	mg/kg-day	7.3	(mg/kg-day)-1	2E-9
	Indeno[1,2,3-cd]pyrene	0.86	mg/kg	0.13	0.86	mg/kg	M	8.3E-10	mg/kg-day	0.73	(mg/kg-day)-1	6E-10
	Naphthalene	1.4	mg/kg	0.13	1.4	mg/kg	M	--	--	ND	--	--
	Phenanthrene	3.6	mg/kg	0.13	3.6	mg/kg	M	--	--	ND	--	--
	PCBs	5.2	mg/kg	0.14	5.2	mg/kg	M	5.4E-9	mg/kg-day	2.0	(mg/kg-day)-1	1E-8
	Aroclor® 1254	0.55	mg/kg	0.14	0.55	mg/kg	M	--	--	ND	--	--
											Total Risk:	4E-8
											Total Risk Across all Exposure Pathways:	7E-8

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Adults

Table C.1.24. Typical
Calculation of Cancer Risks
Adult Surface Water Exposure: Reasonable Maximum Scenario
Operable Unit 1

Adult Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal PeTypicalability Constant[b]	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	--	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
											Total Risk:	0E+0
Dermal	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
												0E+0
												0E+0

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. El

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface water
Exposure Point: Undeveloped Area surface water
Receptor Population: Trespasser
Receptor Age: Older child

Table C.1.25. Typical
Calculation of Cancer Risks
Older Child Surface Water Exposure: Reasonable Maximum Scenario
Operable Unit 1

Older Child Surface Water Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal PeTypicalability Constantb	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	--	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	--	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
											Total Risk:	0E+0
Dermal	**Metals and Organometallic Compounds**											
	Iron	2.6	mg/L	0.001	2.6	mg/L	M	--	--	ND	--	--
	Lead	0.019	mg/L	--	0.019	mg/L	M	--	--	ND	--	--
	Manganese	0.41	mg/L	0.001	0.41	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
												0E+0
												0E+0

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informatic
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater
Exposure Point: Groundwater sitewide
Receptor Population: Worker
Receptor Age: Adult

Table C.1.26. Typical
Calculation of Cancer Risks
Worker Groundwater Exposure: Reasonable Maximum Scenario
Groundwater

Adult Groundwater Ingestion / Dermal

Exposure Route	Chemical of Concern	Medium EPC Value[a]	Medium Units	Dermal PeTypicalability Constantb	Route EPC	Route EPC Units	EPC Applied	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor[c]	Cancer Slope Factor Units	Cancer Risk
Ingestion	**Metals and Organometallic Compounds**											
	Arsenic	0.0052	mg/L	--	0.0052	mg/L	M	1.7E-6	mg/kg-day	1.5	(mg/kg-day)-1	2.5E-6
	Barium	0.52	mg/L	--	0.52	mg/L	M	--	--	ND	--	--
	Cadmium	0.0038	mg/L	--	0.0038	mg/L	M	--	--	ND	--	--
	Copper	0.018	mg/L	--	0.018	mg/L	M	--	--	ND	--	--
	Iron	16	mg/L	--	16	mg/L	M	--	--	ND	--	--
	Manganese	4.8	mg/L	--	4.8	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.028	mg/L	--	0.028	mg/L	M	--	--	ND	--	--
	Nickel	0.02	mg/L	--	0.02	mg/L	M	--	--	ND	--	--
	Thallium	0.0039	mg/L	--	0.0039	mg/L	M	--	--	ND	--	--
	Vanadium	0.025	mg/L	--	0.025	mg/L	M	--	--	ND	--	--
	Organic Compounds											
	Acetone	0.10	mg/L	--	0.10	mg/L	M	--	--	ND	--	--
	Benzene	0.019	mg/L	--	0.019	mg/L	M	6.1E-6	mg/kg-day	0.055	(mg/kg-day)-1	3.4E-7
	Bis(2-ethylhexyl)phthalate	0.006	mg/L	--	0.006	mg/L	M	1.9E-6	mg/kg-day	0.014	(mg/kg-day)-1	2.7E-8
	Chlorobenzene	0.0064	mg/L	--	0.0064	mg/L	M	--	--	ND	--	--
	Chloroethane	0.0078	mg/L	--	0.0078	mg/L	M	2.5E-6	mg/kg-day	0.0029	(mg/kg-day)-1	7.3E-9
	1,2-Dichloroethene, isomers	0.012	mg/L	--	0.012	mg/L	M	--	--	ND	--	--
	1,4-Dichlorobenzene	0.004	mg/L	--	0.004	mg/L	M	1.3E-6	mg/kg-day	0.024	(mg/kg-day)-1	3.1E-8
	4-Methyl-2-pentanone	0.0095	mg/L	--	0.0095	mg/L	M	--	--	ND	--	--
	4-Methylphenol	0.013	mg/L	--	0.013	mg/L	M	--	--	ND	--	--
	Toluene	0.039	mg/L	--	0.039	mg/L	M	--	--	ND	--	--
	Xylene	0.058	mg/L	--	0.058	mg/L	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.0010	mg/L	--	0.0010	mg/L	M	--	--	ND	--	--
	Naphthalene	0.017	mg/L	--	0.017	mg/L	M	--	--	ND	--	--
											Total Risk:	3.E-06
Dermal	**Metals and Organometallic Compounds**											
	Arsenic	0.0052	mg/L	0.001	0.0052	mg/L	M	1.6E-10	mg/kg-day	1.5	(mg/kg-day)-1	2.3E-10
	Barium	0.52	mg/L	0.001	0.52	mg/L	M	--	--	ND	--	--
	Cadmium	0.0038	mg/L	0.001	0.0038	mg/L	M	--	--	ND	--	--
	Copper	0.018	mg/L	0.001	0.018	mg/L	M	--	--	ND	--	--
	Iron	16	mg/L	0.001	16	mg/L	M	--	--	ND	--	--
	Manganese	4.8	mg/L	0.001	4.8	mg/L	M	--	--	ND	--	--
	Mercury (total)	0.028	mg/L	0.001	0.028	mg/L	M	--	--	ND	--	--
	Nickel	0.02	mg/L	0.0002	0.02	mg/L	M	--	--	ND	--	--
	Thallium	0.0039	mg/L	0.001	0.0039	mg/L	M	--	--	ND	--	--
	Vanadium	0.025	mg/L	0.001	0.025	mg/L	M	--	--	ND	--	--
	Organic Compounds											
	Acetone	0.10	mg/L	0.0014	0.10	mg/L	M	--	--	ND	--	--
	Benzene	0.019	mg/L	0.015	0.019	mg/L	M	8.6E-9	mg/kg-day	0.055	(mg/kg-day)-1	4.7E-10
	Bis(2-ethylhexyl)phthalate	0.006	mg/L	0.025	0.006	mg/L	M	4.5E-9	mg/kg-day	0.014	(mg/kg-day)-1	6.3E-11
	Chlorobenzene	0.0064	mg/L	0.029	0.0064	mg/L	M	--	--	ND	--	--
	Chloroethane	0.0078	mg/L	0.0047	0.0078	mg/L	M	1.1E-9	mg/kg-day	0.0029	(mg/kg-day)-1	3.2E-12
	1,2-Dichloroethene, isomers	0.012	mg/L	0.0079	0.012	mg/L	M	--	--	ND	--	--
	1,4-Dichlorobenzene	0.004	mg/L	0.043	0.004	mg/L	M	5.2E-9	mg/kg-day	0.024	(mg/kg-day)-1	1.2E-10
	4-Methyl-2-pentanone	0.0095	mg/L	0.000036	0.0095	mg/L	M	--	--	ND	--	--
	4-Methylphenol	0.013	mg/L	0.04	0.013	mg/L	M	--	--	ND	--	--
	Toluene	0.039	mg/L	0.012	0.039	mg/L	M	--	--	ND	--	--
	Xylene	0.058	mg/L	0.054	0.058	mg/L	M	--	--	ND	--	--
	PAHs											
	2-Methylnaphthalene	0.0010	mg/L	0.048	0.0010	mg/L	M	--	--	ND	--	--
	Naphthalene	0.017	mg/L	0.048	0.017	mg/L	M	--	--	ND	--	--
											Total Risk:	9E-10
											Total Risk Across all Exposure Pathways:	3E-6

Note:

-- - not applicable
EPA - U.S. Environmental Protection Agency
EPC - exposure point concentration
M - medium-specific
ND - not determined by EPA or not considered to be a carcinogen
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls

[a]Values for all chemicals reflect the lower of either the 95th percentile UCL on the mean or the maximum concencentration.
[b]Absorption factors from U.S. EPA (1999a).
[c]Toxicity values obtained from either the EPA Health Effects Assessment Summary Tables (HEAST) (July 1997a) or EPA Integrated Risk Informati
Toxicity values were adjusted to account for oral absorption in order to calculate risks for dermal exposure on the bases of absorbed doses (U.S. EI